

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Miller, et al
Serial No. 10/634,118
Filed: August 4, 2003
Confirmation No.: 5751
For: **LOCKING WINDOW
HAVING A CAM LATCH**

Appeal No. _____
Group Art Unit: 3676
Examiner: Carlos Lugo

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Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Sir:

AMENDED APPEAL BRIEF

This Appeal Brief is being submitted in this application with respect to the Notice of Appeal filed on February 10, 2007. The fee of \$250 as fee for the Appeal Brief for a small entity was submitted with the initial Appeal Brief. The Commissioner is hereby authorized to charge any additional fees that may be required to Deposit Account 501923.

This Brief contains these items under the following headings, and in the order set forth below:

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APPELLANT'S BRIEF

1. Real Party in Interest

The real party in interest in this appeal is Hughes Supply and Manufacturing Company of Thomasville, Inc., the assignee of all rights to the disclosed invention, LOCKING WINDOW HAVING A CAM LATCH.

2. Related Appeals and Interferences

There are no appeals or interferences that will directly affect or be directly affected by, or have a bearing on the Board's decision in this appeal.

3. Status of Claims

Claim 9-32 and 35-54 remain in the case with none of the claims being allowed. Claims 9-32 and 35-54 are the subject of this appeal. Claims 1-8, 33 and 34 have been cancelled.

4. Status of Amendments

An amendment after the final Office Action dated August 10, 2006 was submitted on November 15, 2006. The Examiner has indicated that the amended claims are not allowable.

5. Summary of Claimed Subject Matter

5.1 Overview of claimed system and method

The present invention relates to a window latch for a locking window. Generally, the invention is a locking window having a frame including at least one window sash that is selectively movable between a first closed position and a second open position and a window latch adapted to be attached to the window. The window latch is selectively movable between a first open position and a second locked position to secure the window sash in the closed position. The window latch includes a cam latch, a housing including a support wall, a pivot fastener for attaching the cam latch to the housing, and a detent for retaining the cam latch in one of the open and locked positions.

The window latch comprises, in combination with other claimed elements, a housing including a support wall extending across the center of the housing and extending downward to engage the surface of the window sash to provide support for the housing. Such a construction enables use of lightweight, durable materials, as explained in detail in the original application at Page 11, line 9 to Page 13, line 23, and elsewhere.

Independent Claim 9 describes a window latch for a locking window including: a cam latch; a housing having an opening and a perimeter wall and a pair of interior support walls; a pivot fastener; a bushing; and a detent which includes at least one protrusion on one of said housing and said cam latch and a receiving groove on said other of said housing and said cam latch, wherein the protrusion and the groove are substantially parallel to the axis of the pivot fastener. The cam latch is identified with reference number 16 in Figures 2A and 2B and is described in the specification at page 2, lines 15-19; page 6, lines 15-17; and its operation is described at page 10, lines 17-25. The housing is identified with reference number 22 in Figure 3A and is described at page 3, line 27 through page 4, line 4 and page 7, lines 9-11. The interior

support walls are identified with reference numbers 46 and 50 in Figures 2A, 3A and 3B and are described at page 4, lines 1-3 and page 7, lines 9-11. The pivot fastener is identified with reference numbers 28 and 28' in Figures 2A, 4, 5, 6A and 6B and is described in the specification at page 7, lines 12-25. The fastener itself is designated as reference number 48 and is described at page 7, lines 18-19. The bushing is identified with reference number 92 in Figures 6A, 6B, and 6C, and is described in the specification at page 9, line 30 to page 10, line 25 and page 12, line 10 to page 13, line 19. Several configurations of the detent are described in the specification. A general description is at page 8, lines 11-18. A detailed description of an embodiment with protrusions 60 on the housing cooperating with grooves 68 on the cam, which is shown in Figures 3B, 4A, 4B, 5A, 5B and 6B, is at page 8, line 19 through page 9, line 29. Another configuration of the detent comprising a bushing 92 and a groove 98, with protrusions 94 and resilient region 90, is described at page 9, line 30 through page 10, line 25.

Independent Claim 29 describes a locking window including: a cam latch; a window frame with a movable sash; a housing having an opening and a perimeter wall and a pair of interior support walls; a pivot fastener; a bushing; and a detent which includes at least one protrusion on one of said housing and said cam latch and a receiving groove on said other of said housing and said cam latch, wherein the protrusion and the groove are substantially parallel to the axis of the pivot fastener. The window frame is identified with reference number 14 in Figure 1 and described in the specification at page 6, lines 9-15. The cam latch is identified with reference number 16 in Figures 2A and 2B and is described in the specification at page 2, lines 15-19; page 6, lines 15-17; and its operation is described at page 10, lines 17-25. The housing is identified with reference number 22 in Figure 3A and is described at page 3, line 27 through page 4, line 4 and page 7, lines 9-11. The interior support walls are identified with reference

numbers 46 and 50 in Figures 2A, 3A and 3B and are described at page 4, lines 1-3 and page 7, lines 9-11. The pivot fastener is identified with reference numbers 28 and 28' in Figures 2A, 4, 5, 6A and 6B and is described in the specification at page 7, lines 12-25. The fastener itself is designated as reference number 48 and is described at page 7, lines 18-19. The bushing is identified with reference number 92 in Figures 6A, 6B, and 6C, and is described in the specification at page 9, line 30 to page 10, line 25 and page 12, line 10 to page 13, line 19. Several configurations of the detent are described in the specification. A general description is at page 8, lines 11-18. A detailed description of an embodiment with protrusions 60 on the housing cooperating with grooves 68 on the cam, which is shown in Figures 3B, 4A, 4B, 5A, 5B and 6B, is at page 8, line 19 through page 9, line 29. Another configuration of the detent comprising a bushing 92 and a groove 98, with protrusions 94 and resilient region 90, is described at page 9, line 30 through page 10, line 25.

6. Grounds of Rejection to be Reviewed on Appeal

The following rejections are on appeal:

1. Are Claims 9-14, 17-30, 35-40, and 43-54 properly rejected under 35 U.S.C. §103(a) as being unpatentable over US Pat. No. 4,801,164 to Mosch in view of US Pat. No. 6,135,510 to Diginosa?
2. Are Claims 15, 16, 41 and 42 properly rejected under 35 U.S.C. §103(a) as being unpatentable over US Pat. No. 4,801,164 to Mosch in view of US Pat. No. 6,135,510 to Diginosa as applied to claims 14 and 40 above, and further in view of US Pat. No. 6,568,723 to Murphy et al?
3. Are Claims 31 and 32 properly rejected under 35 U.S.C. §103(a) as being unpatentable over US Pat. No. 4,801,164 to Mosch in view of US Pat. No. 6,135,510 to Diginosa as applied to Claim 29 above, and further in view of US Pat. No. 1,948,542 to Repass?

7. Arguments

7.1 Claims 9-14, 17-30, 35-40, and 43-54 are not obvious

The Examiner has conceded that Mosch fails to disclose supporting walls that engage the surface of the window sash. However, the Examiner looks to Diginosa for a teaching that it would be well known in the art to have supporting walls that extend from one perimeter wall to another perimeter wall and that engage a surface of a window sash so as to impart strength to the housing. It is the burden of the Patent Examiner to establish a prima facie case of obviousness when rejecting claims under 35 USC §103. In re Reuter, 651 F.2d 751, 210 USPQ 249 (CCPA 1981). In this case, the Patent Office has failed in several respects to meet this burden.

The Examiner has also failed to address several claim elements in the Office Action, implicitly conceding that they are not present in the references. In particular, the requirement in Claim 1(e) that "said protrusion and said groove [of the detent] being substantially parallel to the axis of said pivot fastener" is shown not in cited art. In addition, the elements in Claim 1(b) that "said pair of rigid interior support walls extend downward to engage the surface of the window sash;" in Claims 22 and 48 that "said support wall is between said aperture and cam latch;" and in Claims 23 and 49 that "said support wall is substantially perpendicular to said window frame" are not found or suggested in any of the references.

7.1.1 There Must Be a Basis in the Art for Combining or Modifying References

It has been repeatedly held by the Court of Appeals for the Federal Circuit that absent some teaching, suggestion, or incentive supporting a combination of references, obviousness cannot be established by combining the teachings of the prior art. ACS Hospital Systems, Inc. v. Montefiori Hospital, 732 F.2d 1572, 1577, 221 USPQ 929, 939 (Fed.Cir. 1984). This has been interpreted to mean that there must be a reasonable intrinsic or extrinsic justification for the

proposed combination of references in order to properly reject the claims of an invention. The examiner must propose some logical reason apparent from the evidence of record that justifies his combination or modification of references. In re Regel, 188 USPQ 132 (CCPA 1975). Therefore, it is important in the instant situation to examine whether or not there exists a reasonable intrinsic or extrinsic justification for the proposed combination of references.

Neither reference appears to consider the need for additional strength and support. Mosch appears to be a conventional steel or cast metal sash lock. Such locks are inherently strong and rigid. Diginosa is a slide lock and, by the nature of this design, very little force is transmitted to the housing. Accordingly, neither of these references appears to consider any need for reinforcing the housing of a sash lock.

Thus, it is submitted that the Examiner failed to justify making any modification to Mosch at all. Certainly, if such a modification were contemplated, one would not look to a side-sash slide lock developed for the purpose of eliminating the need for Mosch's top-sash cam lock (see e.g. '510 at col. 1, lines 44-51). When the prior art itself provides no apparent reason for one of ordinary skill in the art to make a modification or combination of references, an argument properly exists that the claimed subject matter would not have been obvious.

7.1.2 References are Not Properly Combinable or Modifiable if Their Intended Function is Destroyed

Where a combination of references require that a secondary reference be used to modify a primary reference and where the modification destroys the purpose or function of the primary reference, a person of ordinary skill in the art would not normally tend to make modification. Therefore, both the CCPA and the Federal Circuit have consistently held that where an obviousness-type rejection is based upon a combination of references, in which the modification of the primary reference by the secondary reference would destroy the intent, purpose or function

of the invention disclosed in the primary reference, such a proposed modification is improper. In re Gordon, 733 F. 2d 900, 221 USPQ 1125 (Fed.Cir. 1984).

Figures 16 and 17 of the Diginosa '510 reference show that the purpose of the interior walls is to provide a guide surface with detents for positioning the sliding lock. The addition of these guide surfaces to a rotating cam lock would defeat the purpose of the cam mechanism and render the cam unable to mesh with the locking arm catch 20 on the opposing sash, thus destroying the function of the primary reference.

7.1.3 Prior Art Does Not Teach Source of The Problem

Even though the solution to a problem, once known, may have a simple answer, the recognition of the problem itself or of the source of the problem is not necessarily obvious. Eibel Process Co. v. Minnesota and Ontario Paper Co., 261 U.S. 45 (1923). This early Supreme Court decision has established the long-standing rule that the discovery of a source of a problem alone may result in a patentable invention despite the fact that solution was relatively simple. In the present case, the problem itself is how to add strength to a housing of sash lock while maintaining a conventional appearance such a design allows the use of plastic and other more flexible materials than previously considered (see e.g. specification at page 1, lines 18-31 and page 2, lines 1-9). The present invention solves this problem in a way that is not shown nor suggested by the prior art.

7.1.4 The detent structure is not suggested by the references

Claim 1(e) requires that the protrusion and groove of the detent are substantially parallel to the axis of the pivot fastener. In Mosch, the detent is perpendicular to the axis of the pivot fastener. Diginosa does not have a pivot fastener, so it does not teach anything about the placement of detents in a cam lock. The present invention describes two different detent

structures: a protrusion 60 that is received in a groove 68 with a barbell shaped end 64 (See Fig. 4B; p. 8, line 19 to p. 9, line 29); and a resilient bushing 92 with projections 94 that engage a groove 98 in the housing (See Fig. 6B and 6C; p. 9, line 30 to p. 10, line 25) is simply not shown or suggested by the Mosch and Diginosa references. Mosch uses a spring washer that is mounted perpendicular to the pivot fastener. Diginosa uses a cantilever that engages with the notches in the side of the housing, but offers no suggestion of how such a system could be used in a rotating cam lock. The detent structure of the present invention is designed to provide an audible snap (p. 8, lines 11-18; p. 10, lines 17-25), which is enhanced by the shape and orientation of the resilient bushing, and not suggested by the cited references.

7.1.5 Claims 22 and 48 are not suggested by Diginosa

The Office Action asserts that "Mosch, as modify [sic] by Diginosa, illustrates that the support wall is between the aperture and cam latch." (p. 4) Not only does Diginosa fail to suggest extending the support wall to the surface of the sash, as described above, it fails to suggest a location for the "support wall." The Examiner indicates in attachment #1 to the Office Action that the "rigid supporting walls" of Diginosa are the hollow fastener receiving column 27 and the undesignated walls that connect them to the perimeter walls of the two rectangular box sections 23. Even if these undesignated walls were placed in the box sections for support (as opposed to the more likely reason of permitting the housing to be produced by injection molding), there is no suggestion to use them to support the housing of a cam latch "between the aperture and cam latch." These undesignated wall in Diginosa is located between the aperture 27 and both the inner and outer walls of the box section 23, thus it provides no suggestion of placing walls between the aperture and a cam latch. Moreover, it does not support the placement of a pair of walls between a pair of apertures and a cam latch.

7.2 Claims 15, 16, 41 and 42 are not obvious

For the reasons set forth above, the Mosch/Diginosa combination that forms the basis for the rejections of claims 15, 16, 41, and 42 fails to meet the statutory requirements under 35 USC §103.

7.3 Claims 31 and 32 are not obvious

For the reasons set forth above, Claim 31 is not obvious. The addition of the Repass reference does not cure the deficiencies of the Mosch/Diginosa combination, especially as discussed in Section 7.1.4. Repass teaches a detent structure including a stud 27 and a notch 28. However, it does not teach or suggest that the stud is received by a groove. Referring to Fig. 5 of Repass, the notch 28 is not a receiving groove, but is simply a notch in the plate of the cam. More importantly, it does not meet the requirement of Claim 29 that the detent "[retain] said cam latch in one of said open and said locked positions." The stud and notch of Repass merely acts as a stop to prevent further movement of the cam latch; it does not retain the latch in the open or close position.

Claim 32 requires that "said semi-circular receiving groove including at least one barbell shaped portion for receiving said protrusion, said protrusion being substantially parallel to the axis of said pivot fastener and said groove being substantially perpendicular to the axis of said pivot fastener." This claim is specifically directed to the embodiment having a protrusion 60 that is received in a groove 68 with a barbell shaped end 64 (See Fig. 4B; p. 8, line 19 to p. 9, line 29). As set forth above, the stud and notch cited by the Examiner do not constitute a groove, and they certainly do not have a barbell shaped portion for receiving a protrusion attached to either the housing or the cam latch. As such, the combination fails to teach or suggest the structure or function of the present invention. None of the cited references would create an audible snap or a tactile feel as a result of the protrusion being captured by the barbell shaped terminus of the groove. This combination is not shown or suggested by the art and is therefore patentable.

7.4 Conclusion

The Applicant respectfully submits the Examiner is incorrect in his belief that claims 9-32 and 35-54 are obvious, and requests that the Board reverse the rejection of the claims.

Respectfully submitted,



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8. Claims Appendix

The appealed claims are as follows:

9. A window latch for a locking window, said window having a window frame including at least one window sash which is selectively movable between a first closed position and a second open position, said window latch comprising:

- (a) a cam latch selectively movable between a first open position and a second locked position to secure the window sash in said closed position;
- (b) a housing including an opening for said cam latch, a perimeter wall having opposing ends defining said opening on one side of said housing, and a pair of rigid interior support walls, each partially defining said opening and extending across said housing from one opposing end of said perimeter wall to said perimeter wall on an opposite side of the housing wherein said perimeter wall having an opening for said cam latch and said pair of rigid interior support walls extend downward to engage the surface of the window sash to provide support for said housing;
- (c) a pivot fastener for attaching said cam latch to said housing;
- (d) a bushing adapted for use with said pivot fastener; and
- (e) a detent for retaining said cam latch in one of said open and said locked positions, wherein said detent includes at least one protrusion on one of said housing and said cam latch and a receiving groove on the other of said housing and said cam latch, said receiving groove for receiving said protrusion, said protrusion and said groove being substantially parallel to the axis of said pivot fastener.

10. The apparatus according to Claim 9, wherein said cam latch includes an actuator arm, a locking arm and a pivot point location between said actuator arm and said locking arm.

11. The apparatus according to Claim 10, further including a finger tab on said actuator arm.

12. The apparatus according to Claim 10, said locking arm further including a cam wall.

13. The apparatus according to Claim 10, wherein the ratio of the length of said actuator arm to the length of said locking arm is greater than about 2 to provide a mechanical advantage when said window latch is operated.

14. The apparatus according to Claim 10, wherein one of said actuator arm and said locking arm includes a key lock receptor and the other of said actuator arm and said locking arm including a complementary key lock extending into said key lock receptor for attaching said cam latch to said housing.

15. The apparatus according to Claim 14, further including a fastener extending into said key lock and key lock receptor.

16. The apparatus according to Claim 15, said fastener is a self-tapping threaded fastener.

17. The apparatus according to Claim 14, one of said key lock and said key lock receptor further including an alignment feature and the other of said key lock and said key lock receptor further including a mating alignment feature.

18. The apparatus according to Claim 9, wherein said housing extends beyond said pivot fastener parallel to said window frame and includes an aperture for receiving a fastener for attaching said housing to said window.

19. The apparatus according to Claim 18, wherein said aperture for receiving a fastener for attaching said housing to said window includes a retainer for receiving a fastener.

20. The apparatus according to Claim 18, wherein the base of said aperture for receiving a fastener includes a cavity for receiving shavings formed by attaching said window latch to said window.

21. The apparatus according to Claim 9, wherein said housing extends beyond said pivot fastener parallel to said window frame to include a finger shoulder for providing access to said cam latch.

22. The apparatus according to Claim 21, wherein said support wall is between said aperture and cam latch.

23. The apparatus according to Claim 22, wherein said support wall is substantially perpendicular to said window frame.

24. The apparatus according to Claim 9, further including a locking arm catch.

25. The apparatus according to Claim 24, further including a cam detent for engaging said locking arm.

26. The apparatus according to Claim 24, further including an aperture for receiving a fastener for attaching said locking arm catch to said window.

27. The apparatus according to Claim 26, wherein said aperture for receiving a fastener for attaching said locking arm catch to said window includes a retainer for receiving a fastener.

28. The apparatus according to Claim 9, wherein said pivot fastener is substantially non-compressible so as to facilitate the selective movement of said cam latch between said first open position and said second locked position.

29. A locking window, said window comprising:

- (a) a window frame including at least one window sash which is selectively movable between a first closed position and a second open position; and

- (b) a window latch adapted to be attached to said window and that is selectively movable between a first open position and a second locked position to secure said window sash in said closed position, said window latch comprising:
- (i) a cam latch selectively movable between a first open position and a second locked position to secure the window sash in said closed position;
 - (ii) a housing including an opening for said cam latch, a perimeter wall having opposing ends defining said opening on one side of said housing, and a pair of interior rigid support walls, each partially defining said opening and extending across said housing from one opposing end of said perimeter wall to said perimeter wall on an opposite side of the housing wherein said perimeter wall having an opening for said cam latch and said pair of rigid interior support walls extend downward to engage the surface of the window sash to provide support for the housing;
 - (iii) a pivot fastener for attaching said cam latch to said housing;
 - (iv) a bushing between said cam latch and said housing; and
 - (v) a detent for retaining said cam latch in one of said open and said locked positions, wherein said detent includes at least one protrusion on one of said housing and said cam latch and a receiving groove on the other of said housing and said cam latch, said receiving groove for receiving said protrusion, said protrusion and said groove being substantially parallel to the axis of said pivot fastener.

30. The apparatus according to Claim 29, wherein said detent provides an audible indication of said cam latch being in one of said open and said locked positions.

31. The apparatus according to Claim 29, wherein said detent includes at least one protrusion on one of said housing and said cam latch and a receiving groove on the other of said housing and said cam latch, said protrusion and said groove being substantially parallel to the axis of said pivot fastener.

32. The apparatus according to Claim 29, wherein said detent includes at least one protrusion on one of said housing and said cam latch and a semi-circular receiving groove on the other of said housing and said cam latch, said semi-circular receiving groove including at least one barbell shaped portion for receiving said protrusion, said protrusion being substantially parallel to the axis of said pivot fastener and said groove being substantially perpendicular to the axis of said pivot fastener.

35. The apparatus according to Claim 29, wherein said detent includes at least one resilient portion on one of said housing and said bushing, said resilient portion for

accommodating said protrusion when said cam latch is moved from one of said open and said locked positions to the other of said open and said locked positions.

36. The apparatus according to Claim 29, wherein said cam latch includes an actuator arm, a locking arm and a pivot point location between said actuator arm and said locking arm.

37. The apparatus according to Claim 36, further including a finger tab on said actuator arm.

38. The apparatus according to Claim 36, said locking arm further including a cam wall.

39. The apparatus according to Claim 36, wherein the ratio of the length of said actuator arm to the length of said locking arm is greater than about 2 to provide a mechanical advantage when said window latch is operated.

40. The apparatus according to Claim 36, wherein one of said actuator arm and said locking arm includes a key lock receptor and the other of said actuator arm and said locking arm includes a complementary key lock extending into said key lock receptor for attaching said cam latch to said housing.

41. The apparatus according to Claim 40, further including a fastener extending into said key lock and key lock receptor.

42. The apparatus according to Claim 41, said fastener is a self-tapping threaded fastener.

43. The apparatus according to Claim 40, one of said key lock and said key lock receptor further including an alignment feature and the other of said key lock and said key lock receptor further including a mating alignment feature.

44. The apparatus according to Claim 29, wherein said housing extends beyond said pivot fastener parallel to said window frame and includes an aperture for receiving a fastener for attaching said housing to said window.

45. The apparatus according to Claim 44, wherein said aperture for receiving a fastener for attaching said housing to said window includes a retainer for receiving a fastener.

46. The apparatus according to Claim 44, wherein the base of said aperture for receiving a fastener includes a cavity for receiving shavings formed by attaching said window latch to said window.

47. The apparatus according to Claim 29, wherein said housing extends beyond said pivot fastener parallel to said window frame to include a finger shoulder for providing access to said cam latch.

48. The apparatus according to Claim 47, wherein said support wall is between said aperture and cam latch.

49. The apparatus according to Claim 48, wherein said support wall is substantially perpendicular to said window frame.

50. The apparatus according to Claim 29, further including a locking arm catch.

51. The apparatus according to Claim 50, further including a cam detent for engaging said locking arm.

52. The apparatus according to Claim 50, further including an aperture for receiving a fastener for attaching said locking arm catch to said window.

53. The apparatus according to Claim 52, wherein said aperture for receiving a fastener for attaching said locking arm catch to said window includes a retainer for receiving a fastener.

54. The apparatus according to Claim 29, wherein said pivot fastener is substantially non-compressible so as to facilitate the selective movement of said cam latch between said first open position and said second locked position.

Claims 1-8 (cancelled)

Claims 33-34 (cancelled)

9. Evidence Appendix

Original application as filed.

US Pat. No. 4,801,164 to Mosch

US Pat. No. 6,135,510 to Diginosa

US Pat. No. 6,568,723 to Murphy et al

US Pat. No. 1,948,542 to Repass

10. Related Proceedings Appendix

None.

A LOCKING WINDOW HAVING A CAM LATCH

Background of the Invention

(1) Field of the Invention

The present invention relates generally to a locking window and, more particularly, to a window latch for such a window.

(2) Description of the Prior Art

Up to the end of World War II, most windows were constructed of wood. However, following the War, aluminum windows were initially constructed for low-end housing. Over time, the clear superiority of metal windows led to their use in many different types of housing. Similarly, vinyl windows were introduced in low-end housing in the beginning of the last decade. The use of vinyl windows has grown much more quickly than metal windows. In fact, the majority of windows are now constructed of vinyl.

During this time, locking windows have generally used metal latches similar to those that were initially used on wooden windows. Now, although vinyl windows are the predominant construction, there has still been a hesitancy to use plastic hardware. However, metal is much heavier than its corresponding plastic counterpart. Also, plastic retains its appearance when mishandled or otherwise misused that would cause unacceptable chips to form on painted metal hardware. Also, in today's modern economy, window hardware may be made in another country. Accordingly, advantages of substantial weight savings and lower shipping costs have become even more important.

However, making a locking window having a plastic latch is more than a mere substitution of materials. Because plastic is generally more flexible than metal, attempts at constructing a window latch having a center mounted sweep latch have failed since there's not a sufficient amount of support across the center of the sweep to prevent bowing. The importance of bowing is primarily due to the requirement by

most manufacturers that the cam latch be able to maintain a static load of about 160 pounds. When a conventional center mounted window latch is formed from plastic materials, the bowing of the cam latch is so substantial that the static load will actually slide off the locking arm. Because of this problem, such window latches have not been able to pass the static load test.

Thus, there remains a need for a new and improved locking window having a window latch which may be completely formed from chip resistant plastics while, at the same time, still provides sufficient strength due to its housing arrangement to resist normal wear and tear during assembly and use.

Summary of the Invention

The present invention is directed to a locking window having a window frame including at least one window sash that is selectively movable between a first closed position and a second open position and a window latch adapted to be attached to the window. The window latch is selectively movable between a first open position and a second locked position to secure the window sash in the closed position. The window latch includes a cam latch, a housing including a support wall, a pivot fastener for attaching the cam latch to the housing, and a detent for retaining the cam latch in one of the open and the locked positions.

In a preferred embodiment, the detent provides an audible indication of the cam latch being in one of the open and the locked positions. This may be accomplished by one of several configurations. For example, the detent may include at least one protrusion on one of the housing and the cam latch and a receiving groove on the other of the housing and the cam latch. Preferably, the protrusion and the groove are substantially parallel to the axis of the pivot fastener.

Alternatively, the detent may include at least one protrusion on one of the housing and the cam latch and a semi-circular receiving groove on the other of the housing and the cam latch. Preferably, the semi-circular receiving groove includes at least one barbell shaped portion for receiving the protrusion. More preferably, the protrusion is substantially parallel to the axis of the pivot fastener and the groove is substantially perpendicular to the axis of the pivot fastener.

In a preferred alternative, the detent may further include a bushing adapted for use with the pivot fastener. In such an arrangement, the detent includes at least one protrusion on one of the housing and the bushing and a receiving groove on the other of the housing and the bushing. The receiving is grooved for receiving the protrusion.

5 Preferably, the protrusion and the groove are substantially parallel to the axis of the pivot fastener. In an even more preferred aspect of the present embodiment, the detent may include at least one resilient portion on one of the housing and the bushing. The resilient portion accommodates the protrusion when the cam latch is moved from one of the open and the locked positions to the other of the open and the

10 locked positions.

Those skilled in the art will appreciate that any of the above-described detent configurations may be used separately or in various combinations with each other and other detent configurations to accomplish the creation of the audible indication of the cam latch being in one of the open and the locked positions.

15 The cam latch may include an actuator arm, a locking arm and a pivot point location between the actuator arm and the locking arm. A finger tab may be included on the actuator arm. Further, the locking arm may include a cam wall. To provide a mechanical advantage when the window latch is operated, a ratio of a length of the actuator arm to a length of the locking arm is greater than about 2.

20 One of the actuator arm and the locking arm may include a key lock receptor and the other of the actuator arms and the locking arms then includes a complementary key lock extending into the key lock receptor for attaching the cam latch to the housing. A fastener may extend into the key lock and key lock receptor. Preferably, such fastener is a self-tapping threaded fastener. Further, one of the key

25 lock and the key lock receptor may include an alignment feature 82 and then the other of the key lock and the key lock receptor includes a mating alignment feature.

The housing may extend beyond the pivot fastener parallel to the window frame and include an aperture for receiving a fastener for attaching the housing to the window. The aperture may include a retainer for receiving a fastener. The base of the

30 aperture for receiving a fastener may include a cavity for receiving shavings formed

by attaching the window latch to the window. The support wall may be between the aperture and cam latch, preferably, being substantially perpendicular to the window frame. The housing may extend beyond the pivot fastener parallel to the window frame to include a finger shoulder for providing access to the cam latch.

5 Also, the window latch may include a locking arm catch. Preferably, the locking arm includes a cam detent for engaging the locking arm. Further, the locking arm catch may include an aperture for receiving a fastener for attaching the locking arm catch to the window. Preferably, the aperture of the locking arm catch may include a retainer for receiving a fastener.

10 In a preferred embodiment, the pivot fastener is substantially non-compressible so as to facilitate the selective movement of the cam latch between the first open position and the second locked position.

Accordingly, one aspect of the present invention is to provide a locking window having a window frame including at least one window sash that is selectively
15 movable between a first closed position and a second open position. A window latch is adapted to be attached to the window. The window latch is selectively movable between a first open position and a second locked position to secure the window sash in the closed position. The window latch includes a cam latch, a housing and a pivot fastener for attaching the cam latch to the housing.

20 Another aspect of the present invention is to provide a window latch for a locking window having a window frame including at least one window sash that is selectively movable between a first closed position and a second open position. The window latch includes a cam latch, a housing including a support wall, and a pivot fastener for attaching the cam latch to the housing. The cam latch is selectively
25 movable between a first open position and a second locked position to secure the window sash in the closed position.

Still another aspect of the present invention is to provide a locking window having a window frame including at least one window sash that is selectively movable between a first closed position and a second open position and a window latch
30 adapted to be attached to the window. The window latch is selectively movable

between a first open position and a second locked position to secure the window sash in the closed position. The window latch includes a cam latch, a housing including a support wall, a pivot fastener for attaching the cam latch to the housing, and a detent for retaining the cam latch in one of the open and the locked positions.

- 5 These and other aspects of the present invention will become apparent to those skilled in the art after a reading of the following description of the preferred embodiment when considered with the drawings.

Brief Description of the Drawings

- 10 FIGURE 1 is a perspective view of a locking window constructed according to the present intention;

 FIGURE 2A is an isometric top exploded view of the window latch of the locking window shown in its closed position;

- 15 FIGURE 2B is an isometric view of the assembled cam latch of the window latch of FIGURE 2A;

 FIGURE 3A is an isometric bottom view of the window latch of the locking window shown in its closed position;

- FIGURE 3B is an isometric bottom exploded view of the housing and the cam latch of the window latch of the locking window shown in its closed position;

- 20 FIGURE 4A is a top view through section of the window latch of FIGURE 1, 2A, and 3A, shown in its closed position;

 FIGURE 4B is a magnified detail of a portion of the top view through section of FIGURE 4A;

- 25 FIGURE 5A is a top view through the same section as FIGURE 4 of the window latch shown in its opened position;

 FIGURE 5B is a magnified detail of a portion of the top view through section of FIGURE 5A

- 30 FIGURE 6A is an exploded isometric top view of a window latch including a bushing;

 FIGURE 6B is an exploded isometric bottom view of the window latch of FIGURE 6A; and

FIGURE 6C is a magnified detail of the bushing of FIGURES 6A and 6B.

Description of the Preferred Embodiments

In the following description, like reference characters designate like or
5 corresponding parts throughout the several views. Also in the following description, it is to be understood that such terms as "forward," "rearward," "front," "back," "right," "left," "upwardly," "downwardly," and the like are words of convenience and are not to be construed as limiting terms.

Referring now to the drawings in general and Figure 1 in particular, it will be
10 understood that the illustrations are for the purpose of describing a preferred embodiment of the invention and are not intended to limit the invention thereto. A perspective partial view of the locking window 10 is shown in Figure 1. The window latch 12 includes a housing 22 fastened to one sash of the frame 14 and a locking arm catch 20 having a cam detent 21 fastened to another corresponding sash of the frame
15 14 and opposite to the housing 22. As seen in Figures 2A and 2B, a cam latch 16 includes an actuator arm 26 and locking arm 30 pivotally mounted through an aperture in the housing 22.

The window 10 is locked by pivotally moving the actuator arm 26 inward toward the housing 22, causing the locking arm 30 to pivotally move away from the
20 housing 22 and engage the cam detent 21 of the locking arm catch 20. The locking arm 30 disengages the cam detent 21 of the locking arm catch 20 and unlocks the window 10 when the actuator arm 26 pivotally moves away from the housing.

As best seen in Figures 2A, 3A, 4A and 4B, in the locked position, the locking arm 30 protrudes beyond the face of the housing 22. By extending into the locking
25 arm catch 20 on the corresponding sash of the frame of the window 10, a cam wall 36 of the locking arm 30 engages the cam detent 21. At the same time, the actuator arm 26 is to one side of the housing 22 of the window latch 12 so as to be substantially aligned with the face of the housing 22. At the advance end of the cam wall 36, the locking arm 30 may include an incline 38, seen in Figures 2A, 2B, 4A, 4B, 5A, 5B
30 and 6A, to better facilitate insertion of the locking arm 30 into the locking arm catch 20 to engage cam detent 21.

As best seen Figures 5A and 5B, in the open position, the locking arm 30 is withdrawn from the locking arm catch 20 and concealed within the housing 22 of the

window latch 12. At the same time, the actuator arm 26 of the cam latch 16 is at another side of the housing 22 of the window latch 12 so as to be substantially aligned with the face of the housing 22 at the other side of the window latch 12.

As previously mentioned, the cam latch 16 includes an actuator arm 26 and a locking arm 30. The cam latch 16 pivots about a pivot point 32. The housing 22 has an aperture at the pivot point 32 to accommodate a pivot fastener 28, 28'. The length of the actuator arm 26 is approximately twice the length of the locking arm 30, thereby providing a mechanical advantage in opening and locking the window 10.

As seen in Figures 3A, 3B, 4A, 5A, 6A and 6B, the housing 22 is strengthened by support walls 46, 50 located between an aperture 40 or 70 for attachment and the pivot point location 32.

The pivot fastener 28, 28' is shown in Figures 2A and 6A in a top exploded view; in Figures 4 and 5 in through sectional views; and in Figure 6B in a bottom exploded view of the window latch 12. The pivot fastener 28, 28' allows the cam latch 16 to pivot freely about the pivot point 32 while the window latch 12 is affixed to the window frame 14. The pivot fastener 28, 28' includes a male key lock portion 28 and a female key lock portion 28', both having a central aperture that allows a fastener 48 to pass therethrough. In the preferred embodiment, the fastener 48 may be any threaded fastener, such as a screw. The female key lock portion 28' is part of the locking arm 30 of the cam latch 16. It will be understood by those skilled in the art that the female key portion 28' may instead be part of the actuator arm 26 and the male portion 28 may be part of the locking arm 30. Further, each of the male key lock portion 28 and the female key portion 28' may include a complementary alignment feature 82 that facilitates the rapid assembly of pivot fastener 28, 28' so that actuator arm 26 and locking arm 30 align properly with the face of housing 22.

A housing 22 having at least a single aperture 40 partially encloses both the locking arm 30 of the cam latch 16 and pivot fastener 28, 28', protecting them from debris that may be generated during construction or installation of the window frame 14 or window 10. The aperture 40 serves as a first attachment point and, in the preferred embodiment, the housing 22 includes a second aperture 70 which serves as a second attachment point for the window latch 12.

Apertures 40 and 70 may each further include an internal retainer 44. An internal retainer 44 may be a small piece of plastic molded into the aperture 40 or aperture 70 that allows a fastener 72 to be temporarily secured in apertures 40 and 70 for packaging or shipping purposes and to prevent loss. Expediting the rapid assembly of window frames in a manufacturing environment is a further advantage of an internal retainer 44.

Each aperture 40 and 70 further may include a cavity 62 in its bottom surface to accommodate shavings generated when the window latch 12 is affixed to the window frame 14. Cavity 62 also may accommodate any pull-up of the window frame 14 during attachment of the window latch 12 to the window frame 14.

The window latch 12 may include structural features such as a detent 56 that limits the range of movement of the cam latch 16 relative to the housing 22. The limited movement of the cam latch 16 may be accomplished through the cooperation of structural features of the housing 22 and the cam latch 16. Likewise these structural features may cooperate in manner that provide a user of the window latch 12 a feel or sound or both that allow the user to know whether the cam latch 16 is fully engaged or fully disengaged position. In this manner, a user may see, feel and hear that the window latch 12 fully engaged or fully disengaged position.

As may be best seen in Figures 3B, 4A, 4B 5A, 5B and 6B, the detent 56 may be a protrusion 60 extending from the housing 22 that cooperates with a groove 68 defined by the cam wall 36 and collar 58 of the locking arm 30. Figures 4A, 4B 5A, and 5B are through sections of the window latch 12 just below the bottom of the upper most inner surface and above the top of the lower most outer surface of housing 22. As seen in Figures 3B, 4A, 4B 5A, 5B and 6B the housing may include a pair of protrusions 60. As seen in Figures 4A, 4B 5A, and 5B the locking arm 30 may include a pair of grooves 68. The longer of the grooves 68 has a slightly enlarged diameter 64 at blind end. The presence of the enlarged diameter 64, which may resemble a barbell shaped region, reduces a diameter of the collar 58 creating a recess for seating one protrusion 60 when the locking arm 30 is moved to the position for engaging the cam detent 21 as shown in Figures 4A and 4B. In this manner, a user window latch experiences the sensations of the one protrusion 60 seating in the recess at the blind end created by the enlarged diameter 64. In addition to seeing, the

sensation may include the feel and audible snap of the cam latch 16 fully engaging. The shorter of the grooves 68 cooperates with the other of the protrusions 60 when the locking arm 30 is moved to the position for fully disengaging the window latch 21 as shown in Figures 5A and 5B.

5 Each protrusion 60 cooperates with a corresponding groove 68 and the collar 58. The protrusions 60 are located proximate to the pivot point 32 of the cam latch 16. In addition to the recess at the barbell shaped region 64 of the longer groove 68, the collar 58 includes regions having different diameters. As seen in Figures 4B and 5B, a smaller diameter region extends from the end of the shorter groove 68 to the
10 start of the longer groove 68. Also as seen in Figures 4B and 5B, a larger diameter region extends from the transition from the smaller diameter region to the larger diameter region to the end of the longer groove 68. The transition from the smaller diameter region to the larger diameter region is opposite the barbell shaped region 64 of the longer groove 68. In addition, the collar 58 includes a groove 80 that is opposite
15 to the end of the shorter groove 68. The pair of protrusions 60 mate with the grooves 68 and collar 58 of the locking arm 30.

 In operation, as the cam latch 16 moves along its range of motion, protrusions 60 travel along the different diameter regions of collar 58, a portion of which may be within grooves 68. As seen in Figures 4A and 4B, when moving cam latch 16 to the
20 fully engaged position, one protrusion 60 reaches the barbell shaped regions 64 while the other reaches groove 80. At this point, the one protrusion 60 enters a barbell shaped region 64 of groove 68, producing an audible snap. As seen in Figures 5A and 5B, when moving cam latch 16 to the fully disengaged position, one protrusion 60 reaches transition from the larger diameter region to the smaller diameter region of
25 collar 58 while the other reaches the end of the shorter groove 68. At this point, the one protrusion 60 drops from the larger diameter region to the smaller diameter region of collar 58, producing an audible snap. The audible snap assists the user in determining whether the window latch 12 is in a fully engaged or fully disengaged position.

30 In addition to or in place of the structures discussed above, the window latch 12 further may include structural features such as a bushing 92 as a detent 56 that limits the range of movement of the cam latch 16 relative to the housing 22.

As may be best seen in Figures 6A, 6B and 6C, the detent 56 may be a protrusion 94 extending from the bushing 92 that cooperates with a groove 98 in a recess 96 defined by the bottom surface of housing 22. The bushing 92 may include a resilient portion 90 that in the present example is created by using a gap 88 adjacent to protrusion 94. The resilient portion 90 acts to compress the bushing 92 to permit the movement of cam latch 16. The bushing 92 may include a pair of protrusions 94 and corresponding gaps 88. As seen in Figures 6A, and 6B the bushing 92 may fit on pivot fastener 28, 28' between the actuator arm 26 and the locking arm 30 and below housing 22 in recesses 96. Each protrusion 94 cooperates with a corresponding groove 98 and the housing 22. Bushing 92 is seated within recess 96 and protrusions 94 are initially aligned with corresponding grooves 98. The protrusions 94 may be located on the outer diameter of the bushing 92. It will be appreciated by those skilled in the art that the protrusion 94 and resilient region 90 may be included as part of the housing 22 and the groove 98 may be in the bushing 92. Any other structural combinations that accomplish at least one of the see, feel, hear and combination thereof functions are part of the present invention.

In operation, as the cam latch 16 moves along its range of motion, protrusions 94 travel from grooves 98 and the wall of recess 96 compresses the resilient region 90 of bushing 92. When moving cam latch 16 to the fully engaged position, the protrusions 94 reach their corresponding grooves 98. At this point, the resilient region 90 replaces the protrusions 94 to their original extended position so that while the protrusions 94 enter their corresponding grooves 68 an audible snap is produced. When moving cam latch 16 to the fully disengaged position, similar events occur. The audible snap assists the user in determining whether the window latch 12 is in a fully engaged or fully disengaged position.

As seen in Figures 4A, 4B, 5A and 5B, the locking arm catch 20 includes a cam detent 21 that the locking arm 30 engages. The locking arm catch 20 has at least one aperture 74. The aperture 74 serves as a first attachment point and, the locking arm catch 20 may include a second aperture 76 that serves as a second attachment point for the window latch 12.

Apertures 74 and 76 may each further include an internal retainer 44. A small piece of plastic molded into the aperture 74 or aperture 76 may act as an internal

retainer 44 that allows a fastener 72 to be temporarily secured in apertures 74 and 76 for packaging or shipping purposes, and to prevent loss. Expediting the rapid assembly of window frames in a manufacturing environment is a further advantage of an internal retainer 44.

5 Each aperture 74 and 76 further may include a cavity 62 in its bottom surface to accommodate shavings generated when the locking arm catch 20 is affixed to the window frame 14. Cavity 62 also may accommodate any pull-up of the window frame 14 during attachment of the window latch 12 to the window frame 14.

10 The window latch 12 may be formed from any lightweight durable material, such as a lightweight metal including aluminum, or a polymeric material. Applicants contemplate that suitable materials may be characterized by at least one of high strength, high rigidity, very good impact resistance, good elastic properties, dimensional stability, low tendency to creep, and simple processing. Preferably, suitable materials may be characterized by a plurality of the above. Applicants have
15 found that among polymeric materials, polyamides (also known as nylons) to work well and, in particular, that polyamides including a filler may work well. In the preferred embodiment, the material used to form the window latch 12 was made using commercially available polyamides such as the "ULTRAMID®" polyamide sold by BASF Corporation of Mount Olive, New Jersey. These ULTRAMID® polyamide
20 materials, their applications, properties and processing as described in a publication by BASF Plastics entitled "ULTRAMID®" Polyamides, the subject mater of which is incorporated in its entirety herein by reference.

Applicants contemplate that a semi-crystalline Nylon 6 (PA6) containing about 30 percent glass fiber may be preferred. One such material is manufactured by
25 Hughes Supply & Manufacturing Company of Thomasville, Inc. of Thomasville, North Carolina under the trademark "FIBERTRON™" material and has the properties presented below in Table 1.

Table 1: FIBERTRON™ MATERIAL			
Description:		Semi-crystalline Nylon 6 (PA6)	
Filler System:		33 % Glass Fiber	
Characteristics:		Near Prime	
PROPERTY	UNITS	TYPICAL VALUES	STANDARD
General			
Density	g/cm3	1.42	ASTM D792
Melt Flow Index	g/10 min.	-	ASTM D1238
Water Absorption	%	-	ASTM D570
Mold Shrinkage	in/in	0.002-0.004	ASTM D955
Mechanical			
Tensile Strength (break)	psi	19,500	ASTM D638
Elongation (break)	%	3.2	ASTM D638
Flexural Strength (yield)	psi	29,750	ASTM D790
Flexural Modulus	psi	1,250,000	ASTM D790
Impact Strength (Izod-notched)	ft-lb/in	3.3	ASTM D256
Thermal			
Heat Deflection Temperature (264psi)	F	-	ASTM D648
Vicat Softening Temperature	F	-	ASTM D1525
Flammability			
UL Flammability Rating	Class	-	UL 94

- The "FIBERTRON™" material may be made using commercially available polyamides such as the "ULTRAMID®" polyamide sold by BASF Corporation of Mount Olive, New Jersey. These ULTRAMID® polyamide materials, their applications, properties and processing as described in a publication by BASF Plastics entitled "ULTRAMID® Polyamides, the subject matter of which is incorporated in its entirety herein by reference.

- Applicants contemplate that alternative materials may appropriate for bushing 92. As with the remainder of the window latch 12, suitable materials for bushing 92 may be characterized by at least one of high strength, high rigidity, very good impact resistance, good elastic properties, dimensional stability, low tendency to creep, and

simple processing. Further, suitable materials for bushing 92 may be characterized by at least one of compatible with the materials used for the remainder of window latch 12, wear resistance, non-abrasive, and a capability of providing the elastic properties for resilient region 90. To that end, bushing 92 may be formed from any lightweight

5 durable material, such as a lightweight metal including aluminum, or a polymeric material. Applicants have found that among polymeric materials, polyoxymethylene (also known as POM, polymethyleneoxide, PMO, polyformaldehyde, polyacetal, acetals, acetal resin, and simple acetal) to work well. Polyoxymethylene including a filler may work well. In the preferred embodiment, the material used to form the

10 bushing 92 are made using commercially available polyoxymethylenes such as the "DELRIN®" acetal resin sold by E.I. du Pont de Nemours and Company of Wilmington, Delaware. These "DELRIN®" acetal resin materials, their applications, properties and processing as described in a publications by E.I. du Pont de Nemours and Company entitled "DELRIN®" acetal resin: Low wear low friction; "DELRIN®"

15 acetal resin: Design Guide-Module III; "DELRIN®" acetal resin: Molding Guide; and "DuPont®" DuPont Engineering Polymers: Products and Properties Guide-"DELRIN®" acetal resin, "DELRIN®" P performance acetal resin, "DELRIN®" "ELEVEN Series" acetal resin, the subject mater of each is incorporated herein by reference in its entirety.

20 As may be appreciated by those skilled in the art, a window and window latch 12 constructed according to the present invention may be substantially completely formed from plastics while at the same time still provide sufficient strength due to their arrangement to resist normal wear and tear during assembly and use.

Certain modifications and improvements will occur to those skilled in the art

25 upon a reading of the foregoing description. It should be understood that all such modifications and improvements have been deleted herein for the sake of conciseness and readability but are properly within the scope of the following claims.

We Claim:

1. A locking window, said window comprising:
 - (a) a window frame including at least one window sash which is selectively movable between a first closed position and a second open position; and
 - (b) a window latch adapted to be attached to said window and that is selectively movable between a first open position and a second locked position to secure said window sash in said closed position, said window latch including a cam latch, a housing and a pivot fastener for attaching said cam latch to said housing.
2. The apparatus according to Claim 1, further including a detent for retaining said cam latch in one of said open and said locked positions.
3. The apparatus according to Claim 2, wherein said detent provides an audible indication of said cam latch being in one of said open and said locked positions.
4. The apparatus according to Claim 2, wherein said detent includes at least one protrusion on one of said housing and said cam latch and a receiving groove on the other of said housing and said cam latch, said protrusion and said groove being substantially parallel to the axis of said pivot fastener.
5. The apparatus according to Claim 2, wherein said detent includes at least one protrusion on one of said housing and said cam latch and a semi-circular receiving groove on the other of said housing and said cam latch, said semi-circular receiving groove including at least one barbell shaped portion for receiving said protrusion, said protrusion being substantially parallel to the axis of said pivot fastener and said groove being substantially perpendicular to the axis of said pivot fastener.

6. The apparatus according to Claim 2, further including a bushing adapted for use with said pivot fastener.

5 7. The apparatus according to Claim 6, wherein said detent includes at least one protrusion on one of said housing and said bushing and a receiving groove on the other of said housing and said bushing, said receiving groove for receiving said protrusion, said protrusion and said groove being substantially parallel to the axis of said pivot fastener.

10 8. The apparatus according to Claim 7, wherein said detent includes at least one resilient portion on one of said housing and said bushing, said resilient portion for accommodating said protrusion when said cam latch is moved from one of said open and said locked positions to the other of said open and said locked positions.

15 9. A window latch for a locking window, said window having a window frame including at least one window sash which is selectively movable between a first closed position and a second open position, said window latch comprising:

- (a) an cam latch;
- 20 (b) a housing including a support wall; and
- (c) a pivot fastener for attaching said cam latch to said housing, wherein said cam latch is selectively movable between a first open position and a second locked position to secure said window sash in said closed position.

25 10. The apparatus according to Claim 9, wherein said cam latch includes an actuator arm, a locking arm and a pivot point location between said actuator arm and said locking arm.

30 11. The apparatus according to Claim 9, further including a finger tab on said actuator arm.

12. The apparatus according to Claim 9, said locking arm further including a cam wall.

13. The apparatus according to Claim 9, wherein the ratio of the length of said actuator arm to the length of said locking arm is greater than about 2 to provide a mechanical advantage when said window latch is operated.

14. The apparatus according to Claim 9, one of said actuator arm and said locking arm including a key lock receptor and the other of said actuator arm and said locking arm including a complementary key lock extending into said key lock receptor for attaching said cam latch to said housing.

15. The apparatus according to Claim 14, further including a fastener extending into said key lock and key lock receptor.

16. The apparatus according to Claim 15, said fastener is a self-tapping threaded fastener.

17. The apparatus according to Claim 14, one of said key lock and said key lock receptor further including an alignment feature and the other of said key lock and said key lock receptor further including a mating alignment feature.

18. The apparatus according to Claim 9, wherein said housing extends beyond said pivot fastener parallel to said window frame and includes an aperture for receiving a fastener for attaching said housing to said window.

19. The apparatus according to Claim 18, wherein said aperture for receiving a fastener for attaching said housing to said window includes a retainer for receiving a fastener.

20. The apparatus according to Claim 18, wherein the base of said aperture for receiving a fastener includes a cavity for receiving shavings formed by attaching said window latch to said window.

5 21. The apparatus according to Claim 9, wherein said housing extends beyond said pivot fastener parallel to said window frame to include a finger shoulder for providing access to said cam latch.

22. The apparatus according to Claim 21, wherein said support wall is
10 between said aperture and cam latch.

23. The apparatus according to Claim 22, wherein said support wall is substantially perpendicular to said window frame.

15 24. The apparatus according to Claim 9, further including a locking arm catch.

25. The apparatus according to Claim 24, further including a cam detent for engaging said locking arm.
20

26. The apparatus according to Claim 24, further including an aperture for receiving a fastener for attaching said locking arm catch to said window.

27. The apparatus according to Claim 26, wherein said aperture for
25 receiving a fastener for attaching said locking arm catch to said window includes a retainer for receiving a fastener.

28. The apparatus according to Claim 9, wherein said pivot fastener is substantially non-compressible so as to facilitate the selective movement of said cam
30 latch between said first open position and said second locked position.

29. A locking window, said window comprising:

- (a) a window frame including at least one window sash which is selectively movable between a first closed position and a second open position; and
- (b) a window latch adapted to be attached to said window and that is selectively movable between a first open position and a second locked position to secure said window sash in said closed position, said window latch comprising:
 - (i) a cam latch;
 - (ii) a housing including a support wall;
 - (iii) a pivot fastener for attaching said cam latch to said housing, wherein said cam latch is selectively movable between a first open position and a second locked position to secure said window sash in said closed position; and
 - (iv) a detent for retaining said cam latch in one of said open and said locked positions.

30. The apparatus according to Claim 29, wherein said detent provides an audible indication of said cam latch being in one of said open and said locked positions.

31. The apparatus according to Claim 29, wherein said detent includes at least one protrusion on one of said housing and said cam latch and a receiving groove on the other of said housing and said cam latch, said protrusion and said groove being substantially parallel to the axis of said pivot fastener.

32. The apparatus according to Claim 29, wherein said detent includes at least one protrusion on one of said housing and said cam latch and a semi-circular receiving groove on the other of said housing and said cam latch, said semi-circular receiving groove including at least one barbell shaped portion for receiving said protrusion, said protrusion being substantially parallel to the axis of said pivot

fastener and said groove being substantially perpendicular to the axis of said pivot fastener.

33. The apparatus according to Claim 29, further including a bushing
5 adapted for use with said pivot fastener.

34. The apparatus according to Claim 33, wherein said detent includes at
least one protrusion on one of said housing and said bushing and a receiving groove
on the other of said housing and said bushing, said receiving groove for receiving said
10 protrusion, said protrusion and said groove being substantially parallel to the axis of
said pivot fastener.

35. The apparatus according to Claim 34, wherein said detent includes at
least one resilient portion on one of said housing and said bushing, said resilient
15 portion for accommodating said protrusion when said cam latch is moved from one of
said open and said locked positions to the other of said open and said locked
positions.

36. The apparatus according to Claim 29, wherein said cam latch includes
20 an actuator arm, a locking arm and a pivot point location between said actuator arm
and said locking arm.

37. The apparatus according to Claim 29, further including a finger tab on
said actuator arm.

25

38. The apparatus according to Claim 29, said locking arm further
including a cam wall.

39. The apparatus according to Claim 29, wherein the ratio of the length of
30 said actuator arm to the length of said locking arm is greater than about 2 to provide a
mechanical advantage when said window latch is operated.

40. The apparatus according to Claim 29, one of said actuator arm and said locking arm including a key lock receptor and the other of said actuator arm and said locking arm including a complementary key lock extending into said key lock receptor for attaching said cam latch to said housing.

5

41. The apparatus according to Claim 40, further including a fastener extending into said key lock and key lock receptor.

42. The apparatus according to Claim 41, said fastener is a self-tapping threaded fastener.

10

43. The apparatus according to Claim 40, one of said key lock and said key lock receptor further including an alignment feature and the other of said key lock and said key lock receptor further including a mating alignment feature.

15

44. The apparatus according to Claim 29, wherein said housing extends beyond said pivot fastener parallel to said window frame and includes an aperture for receiving a fastener for attaching said housing to said window.

45. The apparatus according to Claim 44, wherein said aperture for receiving a fastener for attaching said housing to said window includes a retainer for receiving a fastener.

20

46. The apparatus according to Claim 44, wherein the base of said aperture for receiving a fastener includes a cavity for receiving shavings formed by attaching said window latch to said window.

25

47. The apparatus according to Claim 29, wherein said housing extends beyond said pivot fastener parallel to said window frame to include a finger shoulder for providing access to said cam latch.

30

48. The apparatus according to Claim 47, wherein said support wall is between said aperture and cam latch.

5 49. The apparatus according to Claim 48, wherein said support wall is substantially perpendicular to said window frame.

50. The apparatus according to Claim 29, further including a locking arm catch.

10 51. The apparatus according to Claim 50, further including a cam detent for engaging said locking arm.

52. The apparatus according to Claim 50, further including an aperture for receiving a fastener for attaching said locking arm catch to said window.

15

53. The apparatus according to Claim 52, wherein said aperture for receiving a fastener for attaching said locking arm catch to said window includes a retainer for receiving a fastener.

20 54. The apparatus according to Claim 29, wherein said pivot fastener is substantially non-compressible so as to facilitate the selective movement of said cam latch between said first open position and said second locked position.

RULE 63 (37 C.F.R. 1.63)
DECLARATION FOR PATENT APPLICATION
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

As a below named inventor, I hereby declare that my residence, post office address and citizenship are as stated below next to my name, and I believe I am the original, first and sole inventor (if only one name listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled **LOCKING WINDOW HAVING A CAM LATCH** the specification of which (check applicable box(es)):

☒ is attached hereto.
☐ was filed on _____ as U.S. Application Serial No. _____
☐ was filed as PCT international application No. PCT/ _____ / _____ on _____ and (if applicable to U.S. or PCT application) was amended on _____

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose information which is material to the examination of this application in accordance with 37 C.F.R. 1.56(a). I hereby claim foreign priority benefits under 35 U.S.C. 119/365 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed or, if no priority is claimed, before the filing date of this application:

Prior Foreign Application(s):		
Application Number	Country	Day/Month/Year Filed

I hereby claim the benefit under 35 U.S.C. §119(e) of any United States provisional application listed below:

Prior Provisional Application(s):	
Application Serial No.	Day/Month/Year Filed

I hereby claim the benefit under 35 U.S.C. 120/365 of all prior United States and PCT international applications listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in such prior application in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge the duty to disclose material information as defined in 37 C.F.R. 1.56(a) which occurred between the filing date of the prior applications and the national or PCT international filing date of this application:

Prior U.S./PCT Application(s):		Status: patented, pending, abandoned
Application Serial No.	Date/Month/Year Filed	

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

1) Inventor's Signature	<u>D. Keith Miller</u>	Date	<u>7-31-01</u>
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2) Inventor's Signature	<u>Christopher P. Rogers</u>	Date	<u>7-31-01</u>
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3) Inventor's Signature	<u>Farrell Smith</u>	Date	<u>7-31-01</u>
Inventor's Name (typed)	<u>Farrell Smith</u>		<u>USA</u>
	First Middle Initial Family Name		Citizenship
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FOR ADDITIONAL INVENTORS, check box ☒ and attach sheet with same information and signature and date for each.

RULE 63 (37 C.F.R. 1.63)
DECLARATION FOR PATENT APPLICATION
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

As a below named inventor, I hereby declare that my residence, post office address and citizenship are as stated below next to my name, and I believe I am the original, first and sole inventor (if only one name listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled **LOCKING WINDOW HAVING A CAM LATCH** the specification of which (check applicable box(es)):

☒ is attached hereto.
☐ was filed on _____ as U.S. Application Serial No. _____
☐ was filed as PCT international application No. PCT/ _____ / _____ on _____ and (if applicable to U.S. or PCT application) was amended on _____

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose information which is material to the examination of this application in accordance with 37 C.F.R. 1.56(a). I hereby claim foreign priority benefits under 35 U.S.C. 119/365 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed or, if no priority is claimed, before the filing date of this application:

Prior Foreign Application(s): Application Number	Country	Day/Month/Year Filed
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I hereby claim the benefit under 35 U.S.C. §119(e) of any United States provisional application listed below:

Prior Provisional Application(s): Application Serial No.	Day/Month/Year Filed
---	----------------------

I hereby claim the benefit under 35 U.S.C. 120/365 of all prior United States and PCT international applications listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in such prior application in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge the duty to disclose material information as defined in 37 C.F.R. 1.56(a) which occurred between the filing date of the prior applications and the national or PCT international filing date of this application:

Prior U.S./PCT Application(s): Application Serial No.	Date/Month/Year Filed	Status: patented, pending, abandoned
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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

4) Inventor's Signature [Signature] Date 7-31-01
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First Middle Initial Family Name Citizenship
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Post Office Address 360 Mellon Drive Zip Code 27107

5) Inventor's Signature _____ Date _____
Inventor's Name (typed) _____
First Middle Initial Family Name Citizenship
Residence (City) _____ State/Foreign Country) _____
Post Office Address _____ Zip Code _____

6) Inventor's Signature _____ Date _____
Inventor's Name (typed) _____
First Middle Initial Family Name Citizenship
Residence (City) _____ State/Foreign Country) _____
Post Office Address _____ Zip Code _____

FOR ADDITIONAL INVENTORS, check box ☐ and attach sheet with same information and signature and date for each.

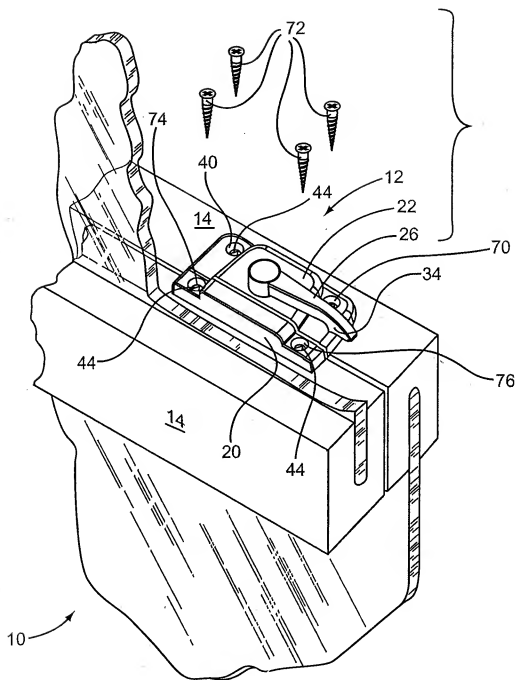


FIG. 1

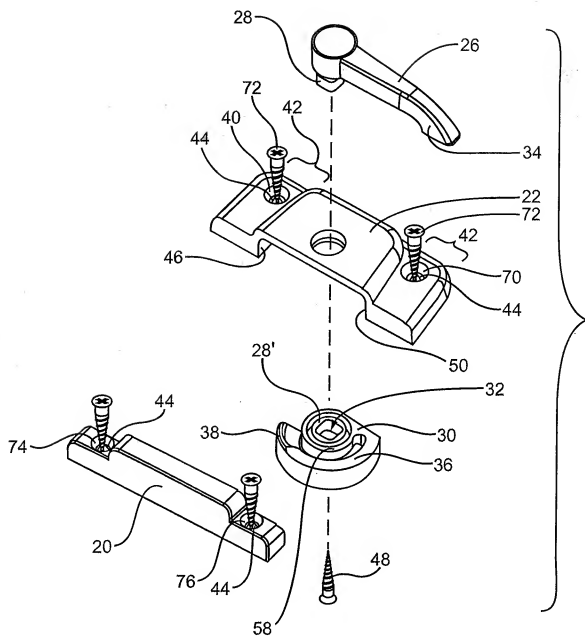


FIG. 2A

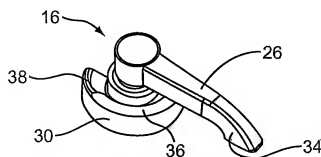


FIG. 2B

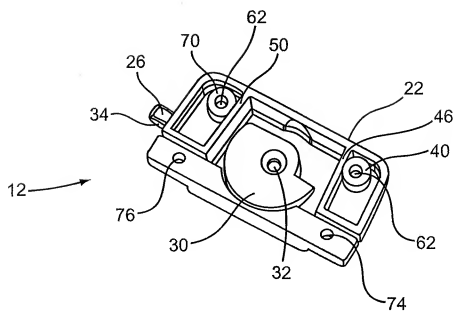


FIG. 3A

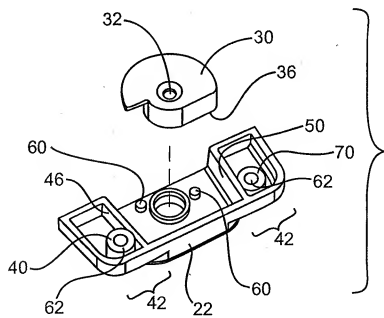


FIG. 3B

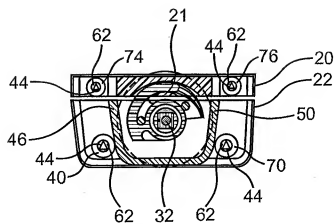


FIG. 4A

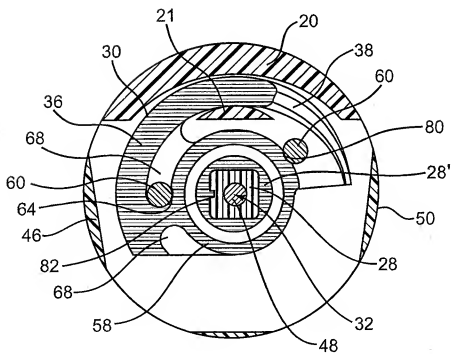


FIG. 4B

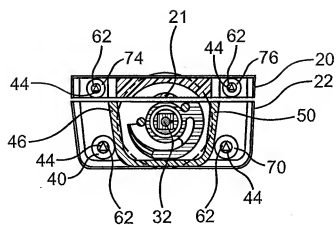


FIG. 5A

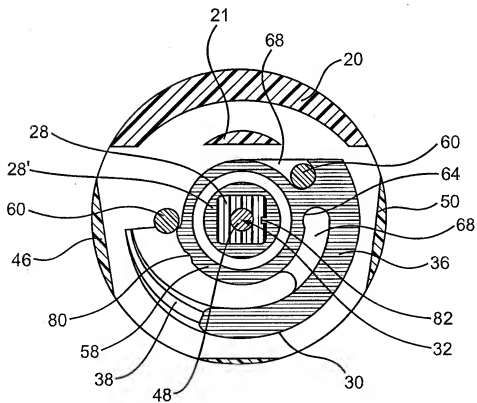


FIG. 5B

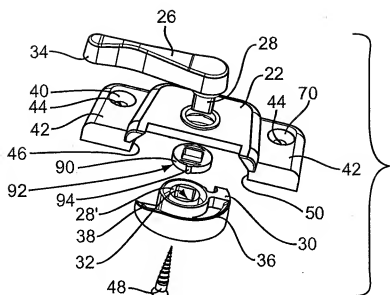


FIG. 6A

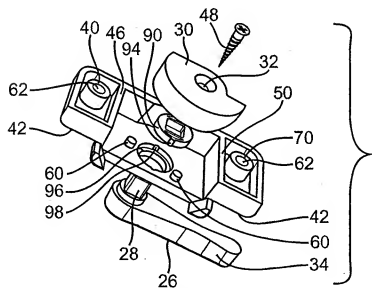


FIG. 6B

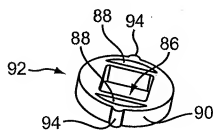


FIG. 6C

United States Patent [19]

Mosch

[11] Patent Number: 4,801,164
[45] Date of Patent: Jan. 31, 1989

- [54] CHECK RAIL LOCK
[75] Inventor: Duane L. Mosch, Owatonna, Minn.
[73] Assignee: Truth Incorporated, Owatonna, Minn.
[21] Appl. No.: 44,239
[22] Filed: Apr. 30, 1987

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3,951,444 4/1976 Shull 292/204 X
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Related U.S. Application Data

- [63] Continuation-in-part of Ser. No. 821,004, Jan. 22, 1986, Pat. No. 4,736,972.

- [51] Int. Cl.⁴ E05C 3/04
[52] U.S. Cl. 292/204; 74/548;
292/209; 292/241; 292/DIG. 47; 292/DIG. 61
[58] Field of Search 292/241, 204, 209, 103,
292/107, DIG. 61, 353, DIG. 7, DIG. 20,
DIG. 47, DIG. 33, DIG. 35, 202; 70/422;
411/554, 555, 349, 517, 519; 24/453, 590, 593,
594, 595; 74/548

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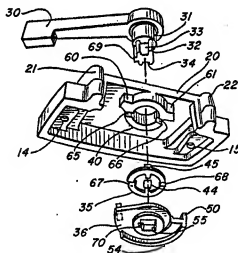
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Primary Examiner—Lloyd A. Gall
Attorney, Agent, or Firm—Wood, Dalton, Phillips,
Mason & Rowe

[57] ABSTRACT

A check rail lock having a housing with an interior space which rotatably mounts a shaft connected to a handle and a cam and with stop members associated with the cam and the housing for limiting rotation of the cam between locked and unlocked positions. The cam is releasably held in either of these positions by mounting of a spring washer on the shaft to which the cam is fixed, and with the spring washer and the housing having coacting detent structure which releasably holds the cam in either the locked or unlocked position. The spring is generally concave for predetermined spring loading and has planar sections with detents to assure good engagement with detent notches on the housing.

3 Claims, 2 Drawing Sheets



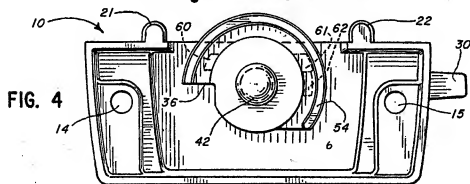
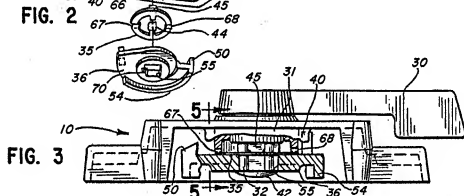
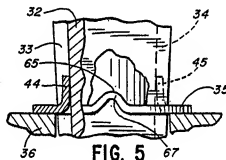
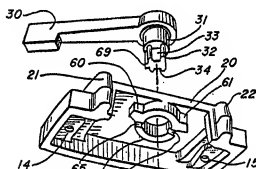
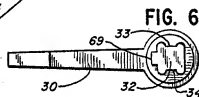
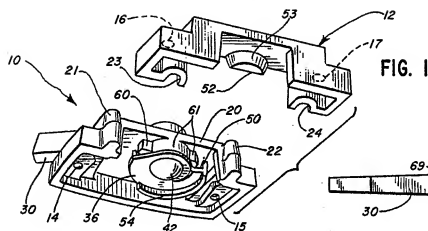


FIG. 7

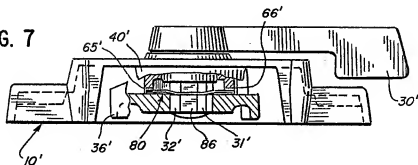


FIG. 8

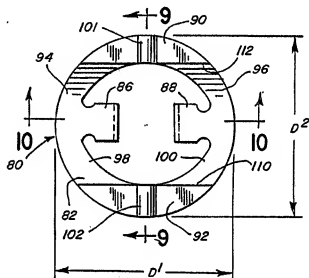


FIG. 9

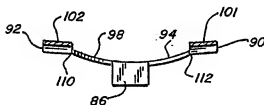
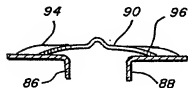


FIG. 10



CHECK RAIL LOCK

CROSS-REFERENCE TO RELATED APPLICATION

This application is a continuation-in-part of application Ser. No. 821,004, filed Jan. 22, 1986, now U.S. Pat. No. 4,736,972.

BACKGROUND OF THE INVENTION

This invention pertains to a check rail lock for use with a double-hung window for drawing together the meeting rails of an upper and lower sash of the double-hung window, and locking the sash against opening movement. The check rail lock has a housing which mounts a rotatable cam for movement between locked and unlocked positions and which engages a keeper in a locked position. There is coacting structure for limiting movement of the cam to movement between locked and unlocked positions. A spring washer is rotatable with the cam and coacting detent structure on the spring washer and the housing releasably retains the cam in either locked or unlocked position.

A check rail lock of the general type disclosed herein is well known in the art. A housing mountable on one window sash has a rotatable cam therein for movement between locked and unlocked positions relative to a keeper mounted on the other sash and with a handle disposed exteriorly of the housing for rotating the cam. In a check rail lock of this type, it is also known to have structure for limiting the rotation of the cam and handle for movement between locked and unlocked positions of the cam and to have spring means for releasably retaining the cam in either locked or unlocked position.

The Bates U.S. Pat. No. 3,811,718 discloses a sash lock for double-hung windows wherein the handle and cam can rotate between a pair of stops fixed to a housing of the lock and a spring member supported by the housing functions to releasably hold the cam in either locked or unlocked position.

A check rail lock having an appearance generally similar to that disclosed herein is shown in the Anderson U.S. Pat. No. Des. 268,643.

A window lock having a cam with a square opening fitted to a shaft with a square section is shown in Chernosky, U.S. Pat. No. 4,436,328.

In order to manufacture and sell a check rail lock at the least possible cost, it is important to have the structure as simple as possible and require a minimal number of assembly steps. The invention disclosed herein is an improvement over the prior art in these respects.

SUMMARY OF THE INVENTION

A primary feature of the invention is to provide a new and improved check rail lock having components mountable on the meeting rails the upper and lower of sash of a double-hung window and which provides for positive alignment of the meeting rails and locking thereof by rotation of a cam which coacts with a keeper and with the cam being located and releasably held in either locked or unlocked position by a relatively simple, easily assembled structure.

An additional feature of the invention is to provide a unique spring washer which exerts tolerance take-up and predetermined loading on a handle of the check rail lock and provides positive detent locking of the cam.

More particularly, the check rail lock has a cam fixed to a shaft integral with a handle and which is rotatable

mounted within a tubular section of the housing of the check rail lock for movement between locked and unlocked positions and a spring washer is positioned between the cam and an exposed end of the housing tubular section and keyed to the shaft for rotation therewith. The spring washer and exposed end of the housing tubular section have coacting detent means as well as there being coacting stop surfaces on the cam and the housing whereby the cam is limited to movement between locked and unlocked positions and the detent means releasably hold the cam in either of said positions.

An object of the invention is to provide a check rail lock having a cam rotatably mounted within a housing by connection to a rotatable shaft integral with a handle and which is rotatably mounted in the housing and with a spring washer also rotatable with the shaft and the spring washer and housing have coacting detent means which releasably hold the cam and handle in either locked or unlocked positions. The spring washer also functions to take up tolerances that may exist between the rotatable shaft and its cam.

Still another object of the invention is to provide a check rail lock comprising, a housing, a cam, means rotatably mounting the cam on the housing for rotation between locked and unlocked positions, coacting stop means on the housing and cam for limiting the rotation of the cam to movement between said locked and unlocked positions, a spring washer rotatable with said cam, and coacting detent means on said housing and spring washer for releasably holding the cam in either locked or unlocked position.

A further object of the invention is to provide a check rail lock comprising, a housing with a top wall and an interior space, a tubular section of the housing depending from the top wall into said interior space and having a lower exposed end, a handle having an integral shaft rotatably mounted in said tubular section and with said shaft having a rectangular section beneath the tubular section with a pair of grooves extending axially thereof, a cam fixed to said rectangular section of the shaft and rotatable through movement of the handle between locked and unlocked positions, a spring washer between said tubular section exposed end and the cam and having a pair of tabs positioned one in each of said axially extending grooves to cause rotation of the spring washer with the shaft, a pair of diametrically opposite detent notches in said tubular section exposed end, a pair of diametrically opposite detents on said spring washer engageable in said detent notches when the cam is in either locked or unlocked position, a pair of stop shoulders on the exterior of the tubular section, and a stop member on the cam movable between said stop shoulders as the cam moves between locked and unlocked positions.

Another object of the invention is to provide a check rail lock as defined in the preceding paragraph wherein said spring washer is generally annular with an annular body shaped both in width and in curvature to provide predetermined loading and wherein the diametrically opposite detents are formed embosses in generally planar parts of said annular body to have the formed embosses be generally parallel with the detent notches in the cam for complete seating of the detents in the detent notches.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view looking at the underside of the check rail lock housing and keeper which are shown in spaced apart relation;

FIG. 2 is a perspective exploded view of the check rail lock housing and associated structure;

FIG. 3 is an elevational view of the check rail housing and associated structure looking in the direction thereof as seen in FIG. 1 and with the cam in locked position and broken away;

FIG. 4 is a bottom plan view of the structure seen in FIG. 3;

FIG. 5 is a fragmentary sectional view taken generally along the line 5-5 in FIG. 3 and on an enlarged scale;

FIG. 6 is a bottom plan view of the handle;

FIG. 7 is a perspective view similar to FIG. 1 of a second embodiment of the invention;

FIG. 8 is a plan view of the detent spring of the second embodiment;

FIG. 9 is a sectional view taken generally along the line 9-9 in FIG. 8; and

FIG. 10 is a sectional view taken generally along the line 10-10 in FIG. 8.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The check rail lock in the embodiment of FIGS. 1-6 has two primary components as seen in FIG. 1 with one of the components being a housing indicated generally at 10 which mounts the movable structure and the other component being a keeper indicated generally at 12.

The housing 10, which is seen looking toward the underside thereof in FIG. 1, is mounted on the meeting rail of the lower sash of a double-hung window and the keeper 12 is mounted in alignment therewith on the meeting rail of the upper sash. Each of these components can be mounted on their respective meeting rails by fastening means such as screws which can extend through openings 14 and 15 of the housing 10 and openings 16 and 17 of the keeper 12.

The housing 10 has a top wall 20 and an outer face with a pair of vertically extending contoured lugs 21 and 22 which can coact with a pair of similarly shaped recesses 23 and 24 on an inner face of the keeper 12. These lugs and recesses function to bring the housing and keeper into alignment as the meeting rails come together upon closing of the window.

The structure associated with the housing 10 is shown in the exploded perspective view of FIG. 2 and includes a handle 30 having an integral shaft 31 with a rectangular section 32 at the lower end thereof having a pair of axially extending grooves 33 and 34. Additional movable structure includes a spring washer 35 and a cam 36. Additionally, handle 30 has an orientation lug 69 which positively engages cam 36 at orientation pocket 70 to assure correct assembly location.

The shaft 31 is rotatably mounted within a tubular section 40 of the housing which depends from the top wall 20 with the rectangular section 32 of the shaft extending below the tubular section 40. The spring washer 35 and the cam 36 are mounted on the rectangular section 32 and these parts are held in assembled relation, as seen in FIG. 3, by means of a spun deformation of an end of the shaft to provide an enlarged rounded end 42.

The spring washer 35 is formed as an annular member to surround the rectangular section 32 of the shaft and has a pair of tabs 44 and 45 formed upwardly from the plane of the spring washer for rotational interlocking relation in the axially extending grooves 33 and 34 whereby the spring washer is caused to rotate with the shaft.

The cam 36 has a raised spiral cam flange 50 which in the unlocked position of the check rail lock is disposed within the interior space of the housing and which can be moved to an engaging position behind a locking member 52 on the keeper having a curved surface 53. A strengthening rib 54 extends generally the same curvature as the cam flange 50 extending downwardly from the cam 36. The cam has a square opening 55 for mounting on the rectangular section 32 of the shaft.

The tubular section 40 of the housing has a pair of stop shoulders 60 and 61 for coaction with a stop member 62 on the upper surface of the cam whereby the stop member coacts with the stop shoulders to limit rotation of the cam between locked and unlocked positions. The coaction between the stop member and the stop shoulder 61 is shown in FIG. 4 when the cam is in locked position.

The spring washer 35 and the tubular section 40 of the housing have coating detent means for releasably holding the cam in either locked or unlocked position. This detent means includes a pair of diametrically opposite detent notches 65 and 66 formed in an exposed lower face of the tubular section 40 and a pair of diametrically opposite detents 67 and 68 deformed upwardly in the annular body of the spring washer and which engage in the detent notches 65 and 66 when the cam 36 is in either locked or unlocked position.

With the check rail lock structure disclosed, the cam can be releasably held in either locked or unlocked position by use of spring means in the form of a spring washer which can be assembled onto the shaft with the cam in a single assembly operation and with the spring washer providing dual functions of tolerance take-up and releasable locking of the cam.

A second embodiment of the check rail lock is shown in FIGS. 7-10 wherein parts which are of the same construction as in the first embodiment are given the same reference numeral with a prime affixed thereto. The housing 10' rotatably mounts a handle 30' with a cam 36' being rotatable within a recess of the housing between two positions. One position is an unlocked position while the other position is a locked position in association with a keeper as disclosed in the embodiment of FIGS. 1-6. The cam 36' is fixed to a rectangular section 32' of a shaft 31' integral with the handle. The shaft 31' is rotatably mounted with a downwardly depending tubular section 40' of the housing. The lower surface of the tubular housing has a pair of diametrically opposite detent notches 65' and 66'.

A spring washer indicated generally at 80 is fixed to the integral shaft 31' for rotation with the handle 30'. The spring washer 80 is fitted between the upper surface of the cam 36' and the lower surface of the tubular section 40' of the housing.

The spring washer 80 is shown particularly in FIGS. 8-10. The spring washer is generally annular with an annular body 82 having a transverse dimension indicated at D' which is slightly greater than the transverse dimension indicated at D².

The spring washer has a pair of diametrically opposite tabs 86 which are integral with the annular body

and which extend inwardly therefrom and also extend downwardly for engaging in axially extending grooves of the integral shaft 31' whereby the spring washer is caused to rotate with the handle 30'.

The spring washer 80 has a complex shape in order to exert a predetermined load on the handle, take up tolerance in the components and provide a good detent action for the handle with extended cycle life.

This complex shape includes a pair of diametrically opposite planar sections 90 and 92 of the annular body of the spring washer interconnected by portions 94 and 96 which mount the tabs 86 and 88 and which are downwardly curved from the planar section 90. Similarly, portions 98 and 100 are downwardly curved from the planar section 92 to form the spring washer with an upwardly concave shape. The spring washer is made of spring steel and the concave shape acts to provide a predetermined load on the handle 30' and take up tolerance of the components because of the positioning of the spring washer between cam 36' and the tubular section 40' of the housing. Portions 94, 96, 98 and 100 of the annular body are slightly reduced in width adjacent the location of the tabs 86 and 88 to provide a tapered beam section and redistribute stresses in the spring washer to thereby increase cycle life of the spring washer.

The spring washer has a pair of diametrically opposite detents 101 and 102 formed in the respective planar sections 90 and 92 by formed embosses to extend upwardly from the planar sections and to coast with the detent notches 65' and 66'.

As seen in FIGS. 9 and 10, the planar sections 90 and 92 are formed from the annular body with a slight bend at 110 and 112 to have the planar sections extend substantially horizontally as seen in the Figures and to thus lie generally parallel to the underside of the tubular section 40' of the housing. This assures that the detents 101 and 102 in the planar sections will fully seat along the length of the detent notches 65' and 66'. These detents are formed in the widest part of the annular body to have maximum length to further assure good positive detent action between the detents and the detent notches.

As described in connection with the embodiments of FIGS. 1-6, the detents and detent notches coast to releasably hold the handle 30' in either of two positions. The one position being with the cam in a locked position in association with the keeper and in the other position the cam is released from the keeper and is enclosed within the perimeter of the housing 10'.

I claim:

1. A check rail lock having a casing having detent means, a handle rotatable in said casing and held in a selected rotative position by a spring washer, a shaft rotatable by the handle, a cam rotatable between locked and unlocked positions, said spring washer between the housing and cam and fastened to the shaft for rotation

with said cam, said spring washer having an annular body with a generally concave configuration to provide a predetermined spring load on the handle, said annular body further having a pair of planar sections connected by a bend to adjacent sections thereof and detents embossed in said planar sections which coast with said detent means.

2. A check rail lock comprising a housing with a top wall and an interior space, a tubular section of the housing depending from the top wall into said interior space and having a lower exposed end, a handle having an integral shaft rotatably mounted in said tubular section and said shaft having a rectangular section beneath the tubular section with a pair of grooves extending axially thereof, a cam fixed to said rectangular section of the shaft and rotatable through movement of the handle between locked and unlocked positions, a spring washer between said tubular section exposed end and the cam and having a pair of tabs positioned one in each of said axially-extending grooves to cause rotation of the spring washer with the shaft, a pair of diametrically opposite detent notches in said tubular section exposed end, a pair of diametrically opposite detents on said spring washer engageable in said detent notches when the cam is in either locked or unlocked position, a pair of stop shoulders on the exterior of the tubular section, a stop member on the cam movable between said stop shoulders as the cam moves between locked and unlocked positions, said spring washer having an annular body with a generally concave configuration to provide a predetermined spring load on the handle, said annular body further having a pair of planar sections connected by a bend to adjacent sections thereof and said detents being formed in the planar sections to have said detents extend generally parallel to said detent notches, and said annular body having a reduced width adjacent said tabs to achieve a predetermined beam load for said detents.

3. A check rail lock comprising a housing, a handle having a shaft rotatable in said housing, a cam, said handle rotatably mounting the cam on the housing for rotation between locked and unlocked positions, a spring washer between the housing and cam and fastened to the shaft for rotation with said cam, coacting detent means on said housing and spring washer for releasably holding the cam in either locked or unlocked position including a pair of diametrically opposed detent notches on the housing, and a pair of diametrically opposed detents on the spring washer, said spring washer having an annular body with a generally concave configuration to provide a predetermined spring load on the handle, and said annular body further having a pair of planar sections connected by a bend to adjacent sections thereof and said detents being formed in said planar sections to have said detents extend generally parallel to said detent notches.

• • • • •



US006135510A

United States Patent [19]

Diginosa

[11] Patent Number: 6,135,510
[45] Date of Patent: Oct. 24, 2000

[54] EGRESS WINDOW LOCK

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[73] Assignee: Royal Plastics Inc., Woodbridge

[21] Appl. No.: 09/302,419

[22] Filed: Apr. 30, 1999

[30] Foreign Application Priority Data

May 1, 1998 [CA] Canada 2236497

[51] Int. Cl.⁷ E05C 1/04

[52] U.S. Cl. 292/145; 292/DIG. 47

[58] Field of Search 49/175, 183, 450, 49/161; 292/137, 138, 145, 175, DIG. 20, DIG. 47

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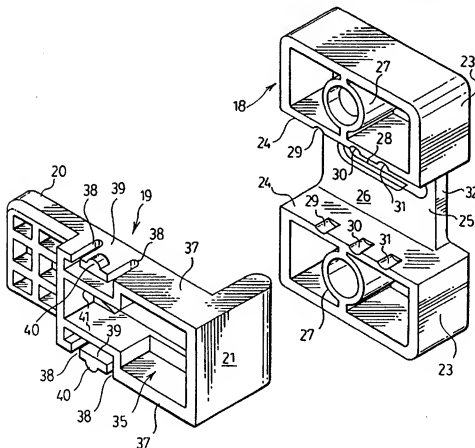
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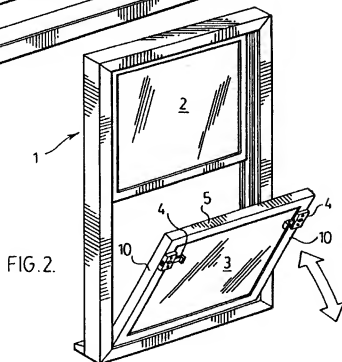
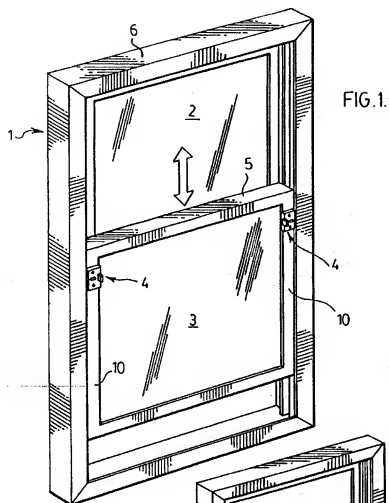
Primary Examiner—B. Dayoan
Assistant Examiner—Gary Estremsky

[57] ABSTRACT

A window lock for a slideable and tiltable window sash. The lock has a housing for attachment to a window unit to present a slideway extending transversely of the sliding movement of the window, and a locking member having a bolt at one end slideable in said housing slideway to move said bolt between a first maximum outwardly projecting sash locking position, a partially retracted sash sliding position for allowing vertical sash sliding movement, and a fully retracted sash tilting position.

20 Claims, 8 Drawing Sheets





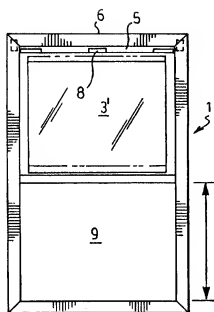


FIG. 4.

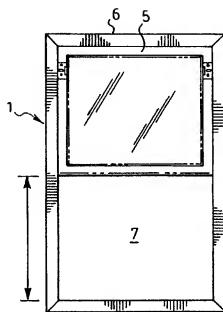


FIG. 3.

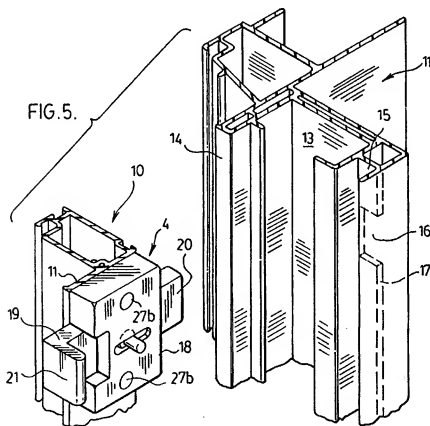


FIG. 5.

FIG. 6.

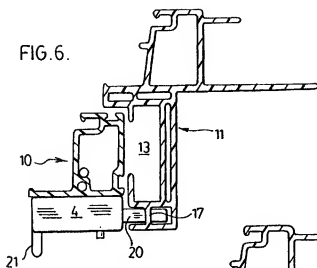


FIG. 7.

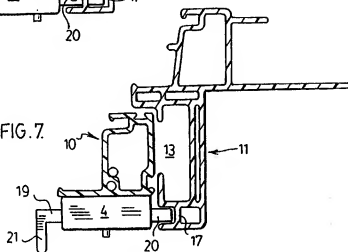
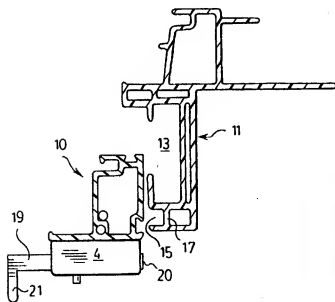


FIG. 8.



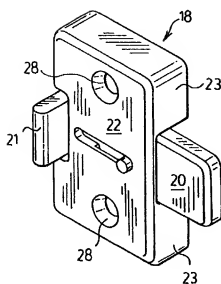


FIG. 9.

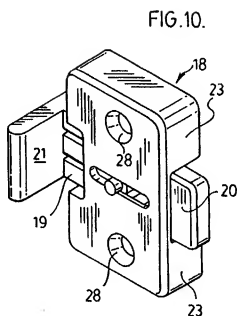


FIG. 10.

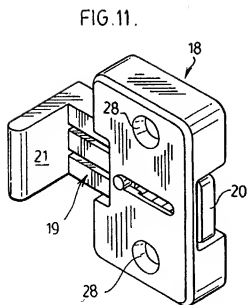
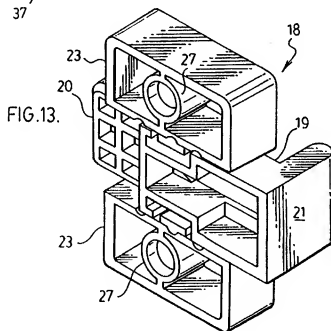
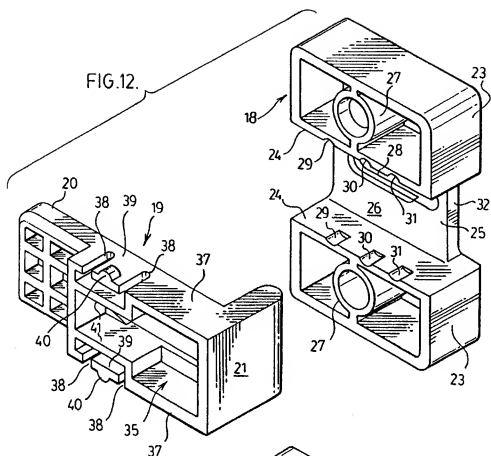
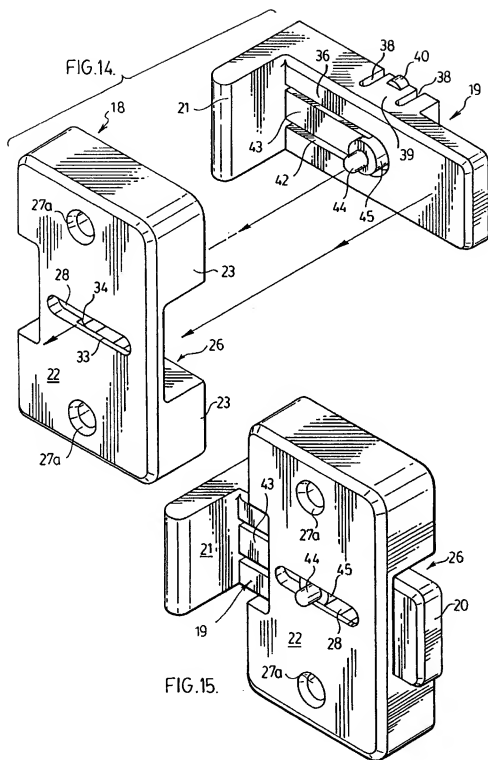


FIG. 11.





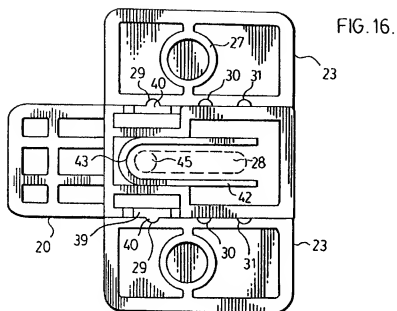


FIG. 17.

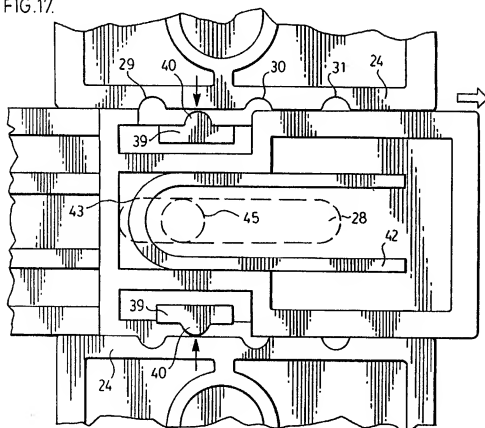


FIG. 18.

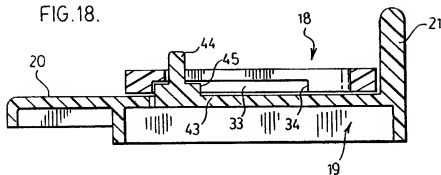


FIG. 19.

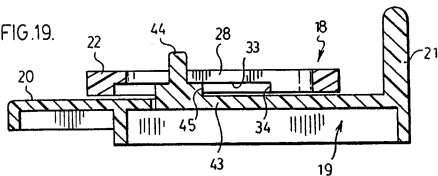
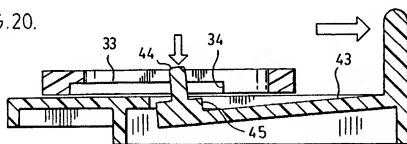


FIG. 20.



EGRESS WINDOW LOCK

FIELD OF THE INVENTION

This invention relates to window locks and more particularly to locks for sashes which are both slideable and swingable or tiltable as found, for example, in single hung windows.

BACKGROUND OF THE INVENTION

At present, for locking sashes which are both slideable and tiltable or swingable as, for example, the vertically sliding and tilting lower sashes of single hung window units the locks are mounted on top of the lower sash header to engage cooperating locking members or keepers mounted on the sill of the upper sash. Two additional pieces of hardware are provided one at each side of the lower sash to retain it against tilting. These latter locking members normally incorporate spring actuated metal plungers which engage in trackways provided in the window frame jambs to prevent unwanted sash tilting. On retraction of the plungers, the lower sash can be tilted about its bottom pivotal connections with its retaining shoes which in turn slide within trackways in the window frame jambs.

Such present hardware is expensive and the presence of a lock on top of the lower sash header limits the upward movement of the lower sash in the window frame. Similarly, if the sash is slideably horizontally, the lock on one end of the sash limits its horizontal opening movement.

By so limiting the movement of the sash, the size of the opening, that is the egress opening, available when the sash is fully open is restricted. Thus, for a given size of egress opening as required by many jurisdictions in which the window is installed, the size of the window frame must be such that it allows for the sliding movement of the sash to provide the required egress opening plus an additional size to accommodate the lock mounted on the top or end of the sash.

This requirement to accommodate the sash lock to achieve a requisite egress opening for safety adds significantly both to the window frame size and the sash area required to close the window frame adding significantly to the cost of the window installation.

It is the object of the present invention to provide a novel and extremely reliable low cost lock which will eliminate the present sash lock thereby increasing the egress opening, will provide a very positive locking of the sash in the closed position or at various open positions and will also allow for the tilting or swinging of the sash for cleaning or reglazing the window.

It is a further object of the invention to provide a lock as aforesaid which incorporates a safety mechanism which will prevent accidental unwanted tilting or swinging of the sash.

It is a further object of the invention to provide such a lock which can be produced by injection molding.

SUMMARY OF THE INVENTION

The invention resides in providing a lock for a slideable and tiltable or swingable window sash of a window unit, the lock comprising a housing for mounting on the window unit to present a slideway extending transversely of the sliding movement of the sash and a locking member having a bolt end slideable in the housing slideway to move the bolt end between an intermediate projecting position for riding in a trackway to retain and guide the window sash for sliding movement, a fully projecting position to engage in a slot in

the bottom of the trackway to lock the sash, and a fully retracted position clear of the trackway to allow tilting or swinging of the sash, the housing and locking member having cooperating means to releasably retain the locking member when moved to the correct sash locking, sliding, and tilting positions.

A further aspect of the invention resides in forming the housing and locking member to provide a spring releasable positive stop preventing accidental movement of the bolt from the sash sliding to the sash tilting or swinging position.

In another aspect, the invention involves a lock incorporating the aforesaid features in which both the housing and the locking member can be formed by injection molding.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view showing the lock of the present invention applied to a single hung window having a vertically slideable and tiltable or swingable lower sash and showing the sash in a partially raised position.

FIG. 2 is a perspective view of the window of FIG. 1 showing the lower sash in a tilted position.

FIG. 3 is an elevational view of the window of FIG. 1 showing the lower sash in the fully raised position.

FIG. 4 is an elevational view of the window frame shown in FIGS. 1, 2 and 3 but showing the lower sash with the prior art top lock in the fully raised position.

FIG. 5 is an exploded fragmentary perspective view illustrating one of the lower sash jambs to which a lock of the present invention has been attached and a window frame jamb on which the lower sash jamb is adapted to slide.

FIG. 6 is a plan view of the lower sash jamb and door frame jamb illustrated in FIG. 5 and showing the lock in its sash locking position.

FIG. 7 is a view similar to FIG. 6 but showing the lock in its sash sliding position.

FIG. 8 is a view similar to FIGS. 6 and 7 but showing the lock in the sash tilting position.

FIG. 9 is a perspective view of the lock with its bolt extended to the locking position corresponding to FIG. 6.

FIG. 10 is a perspective view of the lock showing the bolt partially retracted to the window sliding position corresponding to FIG. 7.

FIG. 11 is a perspective view of the lock showing the bolt fully retracted corresponding to the sash tilting position of FIG. 8.

FIG. 12 is an exploded perspective view looking from the inner side of the casing and the bolt carrying locking member.

FIG. 13 is a perspective view showing the locking member assembled with the housing with the bolt in the sash sliding position.

FIG. 14 is an exploded perspective view of the housing and locking member looking from the outside of the housing.

FIG. 15 is a perspective view of the housing and locking member shown in FIG. 14 assembled with the bolt in the sash sliding position.

FIG. 16 is an elevational view looking at the inner side of the lock and showing the locking member in the fully extended bolt position for locking the lower sash.

FIG. 17 is an enlarged view similar to FIG. 16 but showing the locking member moved to a position in which the bolt is partially retracted between the sash locking and sash sliding positions.

FIG. 18 is a horizontal section through the lock showing the bolt in the sash locking position showing the button carried by the locking member cantilever spring projecting through the housing slot.

FIG. 19 is a view similar to FIG. 18 but showing the locking member moved to retract the bolt with the shoulder of the button carried by the locking member spring cantilever riding on the inner surface of the housing slot towards the top shoulder provided towards the outer end of the housing slot.

FIG. 20 is a view similar to FIG. 19 but showing the locking member further retracted to further retract the bolt end with the button depressed to clear its shoulder inwardly of the housing top shoulder to allow for total retraction of the bolt to the sash tilting position.

DETAILED DESCRIPTION ACCORDING TO THE PREFERRED EMBODIMENTS OF THE PRESENT INVENTION

By way of illustration, the lock of the present invention will be described as applied to a vertically slideable and tiltable sash but it will be understood that it can equally be applied to a horizontal slideable sash which can be swung out or "tilted" for cleaning and glazing.

With reference to the Figures, FIG. 1 shows a window unit comprising a window frame generally designated at 1 incorporating a fixed upper sash 2 and a slideable and tiltable lower sash 3 to which the locks of the present invention generally designated at 4 have been applied.

FIG. 1 shows the lower sash 3 slid vertically upwardly to a partially open position while FIG. 2 shows the lower sash 3 in a tilted position.

FIG. 3 is a front elevational view of the window unit of FIG. 1 but showing the lower sash raised to its fullest extent with its header 5 abutting the header 6 of the window frame leaving an egress or escape opening 7.

FIG. 4 shows a lower sash 3' corresponding to the sash 3 but provided with the conventional top lock 8. The presence of this top lock limits upward sash movement preventing the header of the sash 3' reaching the header of the window frame 1. As a result, the egress or escape opening 9 provided with the sash 3' fully raised is significantly less than the egress opening 7 achieved with the use of the locks 4 of the present invention.

In many jurisdictions there is a minimum area of egress opening required to enable escape through the window. If the egress opening 7 meets the minimum standards required, the egress opening 8 would be unacceptable. To increase the egress opening 8 would then involve increasing the size of the window frame and as well the sizes of the sashes to fill the frame greatly increasing the cost of the window unit.

FIG. 5 is an illustration of an application of the use of the locks of the present invention where the lock 4 has been secured to the sash jamb 10 adapted for sliding on the frame jamb 11.

The jambs 10 and 11 are generally typical extrusions with the sash jamb 10 having a face 12 to which the lock 4 is shown mounted and with the frame jamb 11 having a trackway 13 to slidably receive the conventional shoe (not shown) to which the bottom of the sash 3 is pivoted for the tilting action. The frame jamb 11 is also provided with a flange 14 to prevent outward sash movement and a bolt receiving track 15 having one or more openings or notches 16 in the bottom wall 17 thereof for a purpose as will hereinafter appear.

The lock 4 comprises two parts, a housing 18 for mounting the lock on the sash jamb 10 and a locking member 19 slideable in the housing and having an end in the form of a bolt 20 and a finger grip 21.

As will be seen from FIGS. 6, 7 and 8, the width of the housing 18 of the lock 4, that is the measurement taken in the direction that the locking bolt 20 slides is substantially the same as the width of the sash frame member or jamb 10. Also, as seen in FIG. 6, with the lock bolt moved to its fully locked position, the finger grip 21 is flush with the outer edge of the housing 18. Thus, except for the projecting locking bolt 20, in the fully locked position, the remainder of the lock 4 lies within the edges of the sash frame member or jamb 10.

With the lock 4 mounted to the face of the sash frame member or jamb 10, the locking member 19 has three operating positions illustrated in FIGS. 6, 7 and 8. FIG. 6 shows the position in which the bolt 20 is fully extended projecting into the trackway 15 and through the notch 16 to lock the sash from sliding movement in the window frame. It will be understood that the location of the trackway opening or notch 16 will register with the bolt 20 with the lower sash fully closed to lock the sash in the closed position. Other notches may be provided in the trackway 15 to enable the window to be locked against sliding movement in various raised positions as desired.

FIG. 7 shows the bolt 20 retracted from the opening 16 in the track bottom wall 17 but contained within the trackway enabling the sash to be slid vertically with the bolt riding in the trackway but preventing inward tilting or falling of the sash.

FIG. 8 shows the bolt 20 fully retracted from the trackway 15 to allow tilting of the sash about its pivotal connection with the bottom shoes as will be understood.

FIGS. 9, 10 and 11 show the three positions of the locking member corresponding to FIGS. 6, 7 and 8, that is, with the bolt fully extended to the sash locking position in FIG. 9, the bolt partially retracted to the sash sliding position in FIG. 10 and the bolt fully retracted to the sash tilting position in FIG. 11.

FIGS. 12 to 20 show the details of the lock housing 18 and slideable locking member 19 which are formed as injection molded parts of nylon or nylon reinforced with glass or other suitable material which will give equivalent strength and durability it being understood that such parts can be produced in large volume at relatively low cost.

The housing 18 which is of channel shape comprises a face plate 22 carrying two spaced generally rectangular box sections 23 projecting laterally therefrom with the opposing walls 24 of the sections 23 being parallel and defining, with the portion 25 of the face plate 8 spanning therebetween a slideway 26 to slidably receive the locking member 19. It will be understood that with the channel shaped housing mounted on the sash jamb as illustrated the jamb will close the open side of the housing providing a closed slideway for containing the locking member 19.

The box sections 23 of the housing have centrally thereof a hollow fastener receiving column 27 opening at 27a through the face plate 22. Suitable fasteners 28b projected through the openings 27a and columns 27 enable the housing 18 to be easily and quickly fastened at an appropriate position on the sash with the slideway extending perpendicular to the sash jamb.

As shown, eg. in FIGS. 14 and 15, the portion 25 of the face plate 22 between the box sections 23 has an longitudinal slot 28 therein extending longitudinally of the slideway 26 and exposed centrally thereof.

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As shown particularly in FIG. 12, the opposing walls 24 of the box sections 23 are provided with registering locating notches 29, 30 and 31 corresponding to the sash locking, sash sliding and sash tilting positions of the locking member respectively.

One side the face plate portion 25 is notched as at 32 to enable the end of the locking member 19 provided with the finger grip 21 to lie flush with the respective sides of the box sections 23 with the locking member moved to sash locking position.

As shown in FIG. 14 and more particularly in FIGS. 18 to 20, the wall of the slot 28 is reduced in thickness over a length indicated at 33 corresponding to the distance of the movement of the locking bolt from the sash locking to the sash sliding position and forms a stop shoulder 34 rearwardly of the bolt sash sliding position, that is, between the sash sliding position and the sash tilting position. This stop shoulder 34 is provided to prevent accidental movement of the locking member to the sash tilting position thus providing an important safety feature as hereinafter more fully explained.

With reference to FIGS. 12 and 14 in particular, the locking member 19 has a box section 35 adapted to snugly slide in the housing slideway 26 as shown in FIG. 13.

The side of the box section 35 facing the housing section 25 is closed by a planar slide portion or plate 36 which extends outwardly to form part of the thickened generally planar bolt end 20 as shown in FIG. 14.

The opposing walls 37 of the box section 35 of the locking member which slide along the opposing walls 24 of the slideway 26 are slotted as at 38 to provide short cantilever sections 39 which have a measure of resiliency. These cantilever sections 39 carry outwardly projecting rounded detentes 40 at their free ends for engagement in the respective notches or grooves 29, 30 and 31 in the slideway walls 24 for accurately locating the locking member in the fully extended sash locking bolt position, the partially retracted sash sliding bolt position, and the fully retracted sash tilting bolt position.

For strengthening of the box section 35 of the locking member, the cantilevers 39 are bridged by spaced walls 41 located interiorly of the box section.

As illustrated particularly in FIG. 14, the sliding or plate portion 36 closing one side of the box section 35 is provided with an elongated U-slot 42 defining an elongated cantilever arm 43 extending lengthwise of the locking member and centrally thereof. A button 44 is mounted at the free end of the cantilever 43 through a shoulder abutment 45.

With the locking member assembled with the housing as shown, for instance, in FIG. 15, the button 44 is projected through the housing slot 28 with the shoulder abutment 45 contacting the surface of the housing face portion 25 along the thinned portion 33 of the slot 28.

FIG. 16 shows the locking member 19 in the sash locking position with the bolt end 20 fully extended and with the detentes 40 carried on the short cantilevers 39 of the locking member seated in the grooves or notches 29 of the housing slideway walls 24 to provide an overcomable resistance to the retraction of the locking member from the sash locking position.

FIG. 17 shows the commencement of the retraction of the locking member towards the sash sliding position which will be obtained when the detentes 40 register with the grooves 30.

During this retraction movement of the locking member, the button 44 will remain exposed and move in the housing

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slot 28 with the abutment shoulder 45 moving freely in the section 33 of the slot having a reduced thickness until the bolt is retracted to the sash sliding position. Thereafter interference between the abutment shoulder 45 and the stop shoulder 34 will prevent any further retraction of the locking member so that accidental movement of the bolt from a partially retracted sash sliding position to the sash tilting position is precluded. This arrangement prevents any unwanted inward tilting of the sash that might cause injury or breakage of the glass.

When however it is desired to fully retract the bolt to the sash tilting position, the elongated cantilever 43 provides sufficient resiliency that by depressing the button 44 as shown in FIG. 20 the abutment shoulder 45 can be moved clear of the stop shoulder 34 allowing the complete retraction of the bolt 20 for the sash tilting operation.

In the illustrations the locks 4 are shown mounted on the sash jambs 10 adjoining the tops thereof. It will be appreciated that they may also be mounted on the ends of the sash header 5 or any position relative to the sash 3 and window frame 1 such that the bolt 20 engages in a guiding and retaining slot in the intermediate sash sliding position, enters a notch in the bottom of the slot in the sash locking position and is retracted clear of the slot in the sash tilting position.

While the operation of the lock has been described in connection with a vertically slidable and tiltable sash, it can equally as well be used on horizontally slidable sashes which can be swung out (usually referred to as tiltable) for cleaning and glazing.

It will be understood that the use of the lock of the present invention whether on a vertically slidable or a horizontally slidable "tiltable" sash, will provide for maximum area of egress opening with minimum sash area for a given window frame area.

It will also be understood that with the lock of the present invention a simple lock mounted at each side of the sash performs all of the window functions required eliminating the need for the relatively expensive and additional hardware presently required to achieve these functions.

Further, the lock of the present invention provides an important safety feature avoiding accidental or unwanted sash tilting or swinging which can occur with conventional lock arrangements.

It will also be understood that variations in details of the lock components may be made without departing from the scope of the appended claims.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A window lock mounted on a slidable and tiltable or swingable window sash, said lock having a channel shaped housing for attachment to the face of a frame member of a sliding sash of a window unit to present a slideway extending transversely of the sliding movement of the sash, said housing having a width measured lengthwise of said slideway substantially equal to the width of the sash frame member to fit within the edges of the sash frame member, a locking member having a bolt at one end and a projecting finger grip at the other end, said locking member being slidable in said housing slideway to move said bolt between a first maximum outwardly projecting sash locking position with projecting small grip in abutment with said housing at the end of said slideway opposite to the end from which said bolt projects, a partially retracted sash sliding position for allowing sash sliding movement, and a fully retracted position for allowing sash tilting or swinging.

2. A lock as claimed in claim 1 in which said housing has a transverse slot therein having a length corresponding to the

travel of said bolt from the sash locking to the sash tilting or swinging positions, said locking member having a projection projecting through said slot to limit locking member travel and to indicate the bolt position, and cooperating means between said housing and locking member for releasably retaining said bolt in each of said sash locking, sash sliding and sash tilting positions.

3. A lock as claimed in claim 1 or 2 having releasable stop means to positively block sliding movement of said bolt from said sash sliding position to said sash tilting or swinging position, and means for releasing said releasable stop means to permit sliding movement of said bolt to said sash tilting or swinging position.

4. A lock as claimed in claim 2 in which said housing and said locking member are injection molded members.

5. A lock for a vertically slideable and tiltable window sash slideable in the jambs of a window frame each having a sash shoe trackway and a bolt receiving trackway said bolt receiving trackway having at least one notch in the bottom wall thereof, said lock comprising a channel shaped housing for mounting on the face of a sash frame member and having a dimension adapted to fit between the sides of the sash jamb member to present a slideway having spaced parallel walls extending perpendicularly to the jamb of the sash and in registration with the at least one notch in the recessed trackway with the sash in the closed position, and a locking member slideably mounted in said slideway, said slideable locking member having a planar bolt end moveable on sliding of said locking member between a sash locking position fully projecting from said housing to project into said bolt receiving trackway and through the at least one notch in the bottom wall of said bolt receiving trackway, an intermediate retracted sash sliding position in which said bolt is retracted from said at least one notch while remaining in said bolt receiving trackway, and a fully retracted sash tilting position clear of said bolt receiving trackway, said housing and locking member having cooperating means to accurately locate and releasably retain said locking member in said sash locking, sliding and tilting positions, said locking member having a projecting finger grip for slideably operating said locking member and further comprising walls of said housing slideway being provided with notches at the fully extended bolt position, the intermediate bolt position, and the fully retracted bolt position, and said locking member is formed with spring-biased detentes to engage in said notches.

6. A lock as claimed in claim 5 in which said housing and locking member are formed to provide a disengageable stop blocking slideable movement of said locking member to retract said bolt from said intermediate position to said fully retracted position, and means are provided to disengage said stop to permit retraction of said bolt to said fully retracted position.

7. A lock for a slideable and tiltable or swingable sash, said lock comprising a channel shaped housing for mounting on the face side of a frame jamb member of a sash said housing having a dimension adapted to fit between the edges of the frame jamb member with said channel facing the face of the sash frame member and with its axis perpendicular thereto, a longitudinal axially extending slot in the bottom wall of said channel, a locking member having a bolt at one end slideably mounted in said channel and having a slide limiting projection projecting through said channel slot, the arrangement being such that said locking member is slideable to move said bolt between a maximum projecting sash locking position with said slide limiting projection at one end of said housing slot, an intermediate partially retracted

sash sliding position, and a fully retracted sash tilting position with said slide limiting projection at the other end of said housing slot, said housing and said locking member having cooperating means to accurately locate and releasably retain said bolt end in said intermediate position.

8. A lock as claimed in claim 7 in which said channel has spaced parallel walls and said cooperating means to accurately locate and releasably retain said bolt in said intermediate position comprises a notch in each of said parallel walls channel and a detente carried on a spring cantilever on opposite sides of said locking member, said channel wall notches being located so that said spring cantilever carried detentes register with and engaged in said parallel channel wall notches with said bolt in said intermediate position.

9. A lock as claimed in claim 8 in which said parallel channel walls have corresponding notches located so that said spring cantilever carried detentes register with and snap into said corresponding notches of said parallel channel walls with said bolt fully extended and fully retracted.

10. A lock as claimed in claim 9 in which said projection projecting through said slot comprises a button carried on a cantilever spring arm and having a shoulder riding on the inside of said channel slot between said fully extended bolt position and said intermediate bolt position, a stop surface provided on the inside of said channel slot for engaging said button shoulder to block sliding movement of said locking member from said intermediate position to said fully retracted position while permitting such sliding movement to said fully retracted position on pressing said button member to clear said shoulder from said stop surface.

11. A lock housing for an egress lock for a sliding and tilting or swinging window sash comprising a planar backing, a pair of spaced mounting feet projecting from said backing, for mounting said housing on the face of a sash frame member said mounting feet having a dimension in a direction transverse their spacing adapted to fit within the width of a sash frame member said feet being hollow and having spaced opposed parallel walls forming with said backing a channel slideway for slideably receiving a locking member, said backing having a slot therein centrally of said channel slideway and parallel to said spaced opposing parallel walls to receive a locking member projection and said opposed parallel walls having locking member location indents therein.

12. A lock housing as claimed in claim 11 in which said hollow feet each have therein a hollow fastener receiving column projecting from said backing and opening there-through.

13. A lock housing as claimed in claim 12 formed from a material selected from one of nylon and nylon and glass.

14. A lock housing as claimed in claim 11 or 12 in which said mounting feet are generally rectangular.

15. A lock housing as claimed in claim 11 in which said backing is recessed at one end of said slideway.

16. A lock housing as claimed in claim 15 in which said slot in said backing is formed with a stop shoulder adjacent said backing recess.

17. An injection molded locking member for slideably mounting in a housing slideway comprising a rectangular box section having spaced sidewalls closed on one face by a flat slide plate extending outwardly beyond said box section to present a flat projecting bolt section, each of said sidewalls of said box section being slotted to present a spring cantilever extending perpendicular to said slide plate, each of said spring cantilevers having an outwardly projecting detente at its free end for engagement with an indent in a housing slideway, and a finger grip projecting from said box section.

18. A lock member as claimed in claim 17 in which said slide plate is formed with an elongated U-slot to provide a longitudinal spring cantilever extending in the direction of said bolt section and between said sidewalls, a button carried on the free end of said elongated cantilever projecting outwardly of said slide plate in the direction of said finger grip, said button being joined to said free end of said elongated cantilever by a shoulder formation.

19. A lock member as claimed in claim 17 or 18 provided with an interior wall bridging under said detente carrying cantilever arms formed in said sidewalls of said box section.

20. A lock member as claimed in claim 17 formed from a material selected from one of nylon and nylon and glass.

* * * * *

(12) **United States Patent** **Murphy et al.**

(10) Patent No.: **US 6,568,723 B2**
(45) Date of Patent: **May 27, 2003**

(54) **SASH LOCK FOR A SASH WINDOW**

(75) Inventors: **Mark V. Murphy, Oak Park, IL (US);
Dean Pettit, St. John, IN (US)**

(73) Assignee: **Ashland Products, Inc., Lowell, IN
(US)**

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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Primary Examiner—Gary Estremsky

(74) Attorney, Agent, or Firm—Wallenstein & Wagner, Ltd.

(57) **ABSTRACT**

A sash lock for a sash window assembly is disclosed. The sash window assembly includes an upper sash window and a lower sash window. Each of the sash windows is mounted within opposed guide rails on a master frame. At least one of the sash windows is slidable within the frame relative to the other sash window. The sash lock comprises a keeper for mounting on a stile of one of the sash windows. The keeper includes a keeper surface. The sash lock also includes a locking assembly for mounting on an adjacent stile of the other of the sash windows. The locking assembly includes a housing having a hole, an actuator arm, and a cam having a cam surface for engaging the keeper surface. The locking assembly also includes a shaft extending through the housing hole and operably coupling the actuator arm to the cam. The keeper, the housing, the actuator arm and the shaft are formed of plastic and the cam is formed of metal.

12 Claims, 4 Drawing Sheets

(21) Appl. No.: **09/961,501**

(22) Filed: **Sep. 24, 2001**

(65) **Prior Publication Data**

US 2003/0057717 A1 Mar. 27, 2003

(51) Int. Cl.⁷ **E05C 3/04**

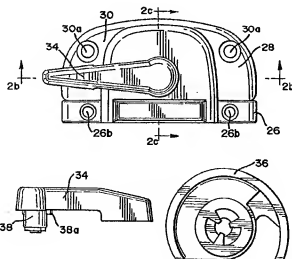
(52) U.S. Cl. **292/241; 292/DIG. 7;
292/DIG. 38; 292/DIG. 47**

(58) Field of Search **292/240, 241,
292/DIG. 7, DIG. 47, DIG. 38**

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FIG. 1

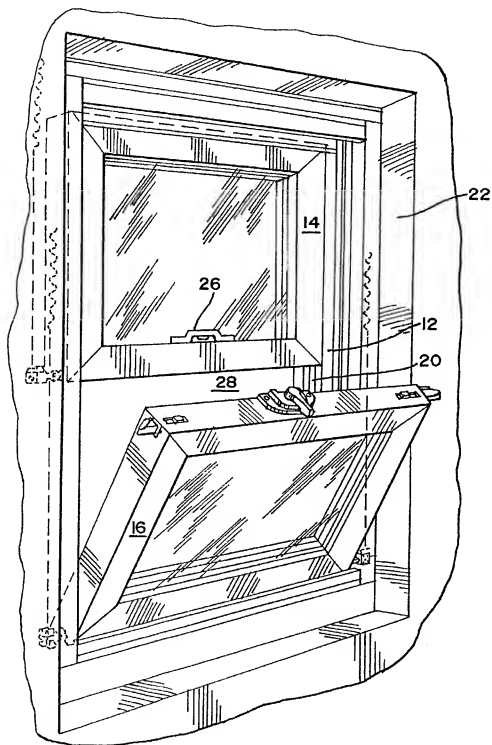


FIG. 2a

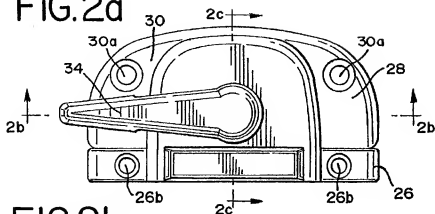


FIG. 2b

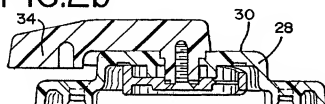


FIG. 2c

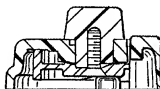


FIG. 3a

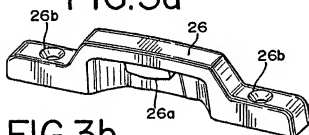


FIG. 3b

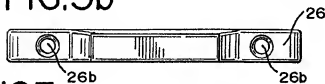


FIG. 3c

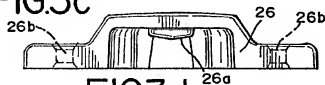


FIG. 3d



FIG. 4a

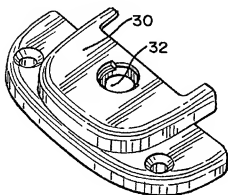


FIG. 4b

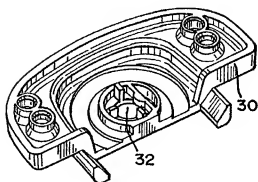


FIG. 4c

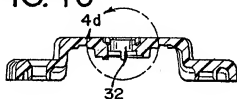


FIG. 4d

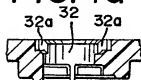


FIG. 5a

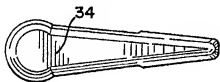


FIG. 5b

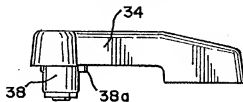


FIG. 5c

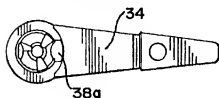


FIG. 6a

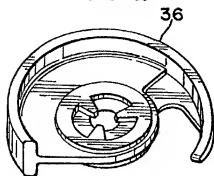


FIG. 6b

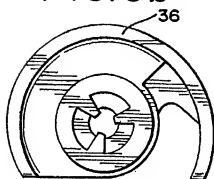


FIG. 6c

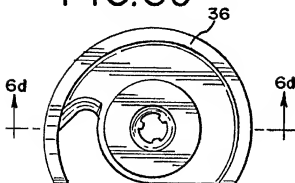
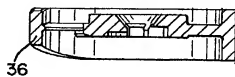


FIG. 6d



SASH LOCK FOR A SASH WINDOW

CROSS-REFERENCE TO RELATED APPLICATIONS

Not Applicable.

FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

Not Applicable.

TECHNICAL FIELD

The present invention relates to a sash lock for a sash window.

BACKGROUND OF THE INVENTION

Prior art to this invention includes U.S. Pat. Nos. 5,582,445; 5,741,032; 6,116,665; 6,142,541; and Re. 35,463. However, none of these patents discloses a sash lock having a cam formed of a metal, such as zinc, and all other components formed of a plastic.

The present invention is provided to solve these and other problems.

SUMMARY OF THE INVENTION

It is an object of the invention to provide a sash lock for a sash window assembly.

In accordance with the invention, the sash window assembly includes an upper sash window and a lower sash window. Each of the sash windows is mounted within opposed guide rails on a master frame. At least one of the sash windows is slidable within the frame relative to the other sash window.

The sash lock comprises a keeper for mounting on a style of one of the sash windows. The keeper includes a keeper surface. The sash lock also includes a locking assembly for mounting on an adjacent style of the other of the sash windows. The locking assembly includes a housing having a hole, an actuator arm, and a cam having a cam surface for engaging the keeper surface. The locking assembly also includes a shaft extending through the housing hole and operably coupling the actuator arm to the cam. The keeper, the housing, the actuator arm and the shaft are formed of plastic and the cam is formed of metal.

It is contemplated that the plastic is glass filled polypropylene, glass filled nylon, or a blend of glass filled polypropylene and nylon.

It is further contemplated that the metal is zinc.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a sash window assembly; FIGS. 2a, 2b, and 2c are a top view of the sash lock of the present invention, and respective sectional views, thereof;

FIGS. 3a, 3b, 3c, and 3d are a perspective view, and top, side and bottom views, of a keeper of the sash lock of FIG. 1;

FIGS. 4a, 4b and 4c are respective perspective views and sectional view of a housing of the sash lock of FIG. 1, FIG. 4d is a detail of FIG. 4c;

FIG. 4e is a detail of a hole in the housing of FIGS. 4a and 4b;

FIGS. 5a, 5b, and 5c are respective top, side and bottom views of an actuator arm of the sash lock of FIG. 1; and

FIGS. 6a, 6b, 6c and 6d are respective perspective, top, bottom and sectional views of a cam of the sash lock of FIG. 1.

DETAILED DESCRIPTION OF THE INVENTION

While this invention is susceptible of embodiment in many different forms, there is shown in the drawings and will herein be described in detail preferred embodiments of the invention with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the broad aspect of the invention to the embodiments illustrated.

A sash lock 10 for a sash window assembly 12 is illustrated in the Figures. Referring in particular to FIG. 1, the sash window assembly 12 includes an upper sash window 14 and a lower sash window 16. Each of the sash windows 14, 16 is mounted within opposed guide rails 20 on a master frame 22. At least one of the sash windows 14, 16 is slidable within the frame 22 relative to the other of the sash windows 14, 16.

Referring now to FIGS. 2-6, the sash lock 10 comprises a keeper 26 for mounting on a style of one of the upper sash windows 14. The keeper 26 includes a keeper surface 26a. The sash lock 10 also includes a locking assembly 28 for mounting on an adjacent style of the lower sash window 16. The locking assembly 28 includes a housing 30 having a hole 32, an actuator arm 34, and a cam 36 having a cam surface 36a for engaging the keeper surface 26a. The locking assembly 28 also includes a shaft 38 extending through the housing hole 32 and operably coupling the actuator arm 34 to the cam 36.

The keeper 26, the housing 30, the actuator arm 34 and the shaft 38 are formed of plastic. The plastic is preferably glass filled polypropylene, glass filled nylon, or a blend of glass filled polypropylene and nylon. The cam 36 is formed of metal, preferably zinc.

The actuator arm 34 and the shaft 38 are a unitary piece. The shaft 38 and the cam 36 have cooperatively mating faces for rotatably securing the shaft 38 to the cam 36. The shaft 38 and the hole 32 have corresponding circumferential surfaces. The shaft has a shaft projection 38a extending from its circumferential surface. The hole 32 has two spaced hole projections 32a extending from its circumferential surface. The shaft projection 38a engages one or the other of the hole projections 32a to limit rotational travel of the actuator arm 34 and thereby define unlocked and locked positions, respectively.

A shaft has a threaded screw receiving hole 38b to receive a metal screw (not shown) to secure the cam 36 to the shaft 38.

The housing 30 has a pair of holes for receiving screws (not shown) to secure the housing 30 to its style. The keeper 26 has a pair of keeper holes 26a for receiving screws (not shown) to secure the keeper 26 to its style.

While the specific embodiments have been illustrated and described, numerous modifications come to mind without significantly departing from the spirit of the invention and the scope of protection is only limited by the scope of the accompanying Claims.

We claim:

1. A sash lock for a sash window assembly, the sash window assembly including an upper sash window and a lower sash window, each of the sash windows mounted within opposed guide rails on a master frame, wherein at least one of the sash windows is slidable within the frame relative to the other sash window, the sash lock comprising:

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a keeper for mounting on a style of one of the sash windows, the keeper including a keeper surface; and a locking assembly for mounting on an adjacent style of the other of the sash windows, the locking assembly including:

- a housing having a hole;
- an actuator arm;
- a cam having a cam surface for engaging the keeper surface; and
- a shaft extending through the housing hole and operably coupling the actuator arm to the cam, wherein the keeper, the housing, the actuator arm and the shaft are formed of plastic and the cam is formed of metal;

the shaft and the hole have corresponding circumferential surfaces;

the shaft has a shaft projection extending from its circumferential surface; and

the hole has spaced hole projections extending from its circumferential surface, and the shaft projection engages one or the other of the hole projections to define an unlocked or locked position, respectively.

2. The sash lock of claim 1, wherein the plastic is glass filled polypropylene.

3. The sash lock of claim 1, wherein the plastic is glass filled blend of polypropylene and nylon.

4. The sash lock of claim 1, wherein the plastic is glass filled nylon.

5. The sash lock of claim 1, wherein the metal is zinc.

6. The sash lock of claim 1, wherein the actuator arm and the shaft are a unitary piece.

7. The sash lock of claim 1, wherein each of the shaft and the cam have cooperatively mating faces for securing the shaft to the cam.

8. The sash lock of claim 1 including a metal screw for securing the cam to the shaft.

4

9. The sash lock of claim 1, wherein the housing has a pair of holes for receiving screws to secure the housing to its style.

10. The sash lock of claim 1, wherein the keeper has a pair of holes for receiving screws to secure the keeper to its style.

11. A sash lock for a sash window assembly, the sash window assembly including an upper sash window and a lower sash window, each of the sash windows mounted within opposed guide rails on a master frame, wherein at least one of the sash windows is slidable within the frame relative to the other sash window, the sash lock comprising:

- a keeper for mounting on a style of one of the sash windows, the keeper including a keeper surface; and
- a locking assembly for mounting on an adjacent style of the other of the sash windows, the locking assembly including:
 - a housing having a hole;
 - an actuator arm having a shaft;
 - a cam having a cam surface for engaging the keeper surface; and

a shaft extending through the housing hole and operably coupled to the cam, the shaft and the housing arranged to cooperatively limit rotational travel of the arm with respect to the housing;

the shaft and the hole have corresponding circumferential surfaces;

the shaft has a shaft projection extending from its circumferential surface; and

the hole has two spaced hole projections on its circumferential surface, wherein the shaft projection engages one of the hole projections to define an unlocked position and engages the other hole projection to define a locked position.

12. The sash lock of claim 11, wherein the keeper, the housing, the actuator arm and the shaft are formed of plastic and the cam is formed of metal.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 6,568,723 B1
DATED : May 27, 2003
INVENTOR(S) : Mark V. Murphy and Dean Pettit

Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Title page,

Item [73], correct the spelling of the name of the Assignee to:

-- Ashland Products, Inc. --

Signed and Sealed this

Twenty-sixth Day of August, 2003

A handwritten signature in black ink, appearing to read "James E. Rogan", written over a horizontal line.

JAMES E. ROGAN
Director of the United States Patent and Trademark Office

Feb. 27, 1934.

W. C. REPASS

1,948,542

SASH LOCK

Filed March 28, 1932

Fig. 1.

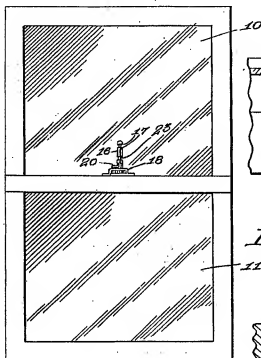


Fig. 2.

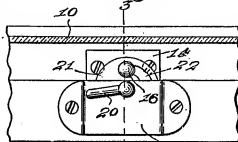


Fig. 4.

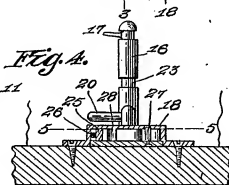


Fig. 5.

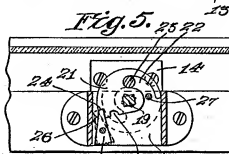


Fig. 3.

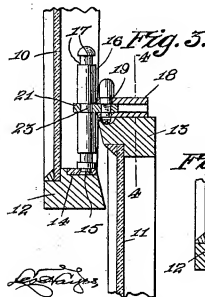
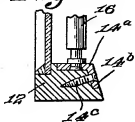


Fig. 6.



W. C. Repass,
INVENTOR
BY Victor J. Evans
ATTORNEY

UNITED STATES PATENT OFFICE

1,948,542

SASH LOCK

Walter C. Repass, Portland, Oreg., assignor to
National Ventilating Window Lock Company,
Portland, Oreg., a corporation

Application March 28, 1932. Serial No. 681,638

1 Claim. (Cl. 292-267)

This invention relates to sash locks and has for an object the provision of a lock by means of which a window sash may be locked in either open or closed position, so that a window may be left open for ventilating purposes and held against further opening movement.

Another object of the invention is the provision of a lock, which in addition to the above and other advantages, is simple in construction, reliable in use and may be readily secured to a window sash.

With the above and other objects in view, the invention further includes the following novel features and details of construction, to be hereinafter more fully described, illustrated in the accompanying drawing and pointed out in the appended claim.

In the drawing:—

Figure 1 is an elevation showing a pair of window sashes with the invention applied.

Figure 2 is a fragmentary view partly in section showing the sash lock in plan.

Figure 3 is a sectional view taken substantially on the line 3-3 of Figure 2 but showing the sash lock in open position.

Figure 4 is a section taken substantially on the line 4-4 of Figure 3 with the sash closed.

Figure 5 is a section on the line 5-5 of Figure 4.

Figure 6 is a fragmentary view showing a slightly different form of the invention.

Referring to the drawing in detail wherein like characters of reference denote corresponding parts, the reference character 10 indicates the upper and 11 the lower sash of a pair of window sashes, the meeting rails being indicated respectively at 12 and 13.

Secured to the meeting rail 12 is a plate 14 and rising from and secured to this plate as shown at 15 is an elongated member 16. This member is preferably cylindrical in form and is provided with spaced circumferential grooves defining spaced pairs of shoulders 17.

Secured to the meeting rail 13 of the sash 11 is a housing 18 which is open at its opposite side edges. Mounted for pivotal movement within this housing upon the squared portion 19 of the shank of an operating handle 20, is a locking plate 21. This plate 21 is positioned within a housing and is adapted to be projected beyond the edge of the housing. The plate 21 is provided with an rotate slot 22 which opens at one edge of the plate and which is adapted to receive the reduced portions 23 provided between the shoulders 17 of the elongated member 16. This is clearly shown in Figures 3 and 5 of the drawing and when the plate is in this position the sash will be locked against relative movement. The plate may be engaged within any of the circumferential grooves to lock the sash either in closed or partly open position.

One edge of the plate is provided with a notch which forms a shoulder 24 and this shoulder is adapted to be engaged by a pivotally mounted dog 25 which is urged into engagement by means of a spring 26. The shoulder 24 is so arranged as to be engaged by the dog 25 when the plate is in locking position and will thus hold the plate against being unlocked. The outer edge of the dog 25 is serrated so as to provide convenient means whereby the dog may be disengaged from the shoulder 24 to move the plate to unlocking position. In this position, the locking plate engages a stud 27 which is receivable within a notch 28 provided in the plate.

If desired, the plate 14, by means of which the elongated member 16 is attached to the sash, may be provided with an apron 14a. This apron extends downwardly along the beveled edge of the meeting rail 12 and is attached to the rail by means of a fastening device 14c. This prevents the window from being opened with a jimmy or other like implement.

The invention is susceptible of various changes in its form, proportions and minor details of construction and the right is herein reserved to make such changes as properly fall within the scope of the appended claim.

Having described the invention what is claimed is:—

A sash lock comprising an elongated member secured to the meeting rails of one of the sashes, a housing having opposite open side edges secured to the meeting rail of the other sash, a handle having a squared portion extending through the housing adjacent one open end thereof, a plate on the squared portion of the operating handle, said plate being mounted within the housing for pivotal movement and provided with an arcuate slot opening out through one edge of the plate, the plate upon operation of the handle in one direction adapted to be projected beyond and through one of the open edges of the housing to receive a reduced portion of the elongated member, said plate provided in one edge thereof and to one side of the square portion of the handle with spaced notches, a spring actuated dog mounted in the housing adjacent one end wall thereof and flush with one of the open ends of said casing, one of the notches of the plate opening out in one corner portion thereof and the other notch being disposed inwardly of the spring actuated dog, a stop in the housing adjacent the opposite open end thereof, the said spring actuated dog engaging in one of said notches to retain said plate against movement and the said stop engaging the other of said notches for limiting the pivotal movement of the plate upon the release of the locking dog therefrom.

10. Related Proceedings Appendix

None.